



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF
DE-9J

October 15, 2002

CERTIFIED MAIL 7001 0320 0006 1467 5051
RETURN RECEIPT REQUESTED

Stewart Warner Corporation
c/o Commonwealth Legal Services
4701 Cox Road, Suite 301
Glen Allen, VA 23060

RE: RCRA 3008(h) Administrative Order
Stewart-Warner Corporation
1514 Drover Street
Indianapolis, Indiana
EPA ID: IND 005 213 715

02 OCT 15 P2:33
US ENVIRONMENTAL
PROTECTION AGENCY
REGION V

RECEIVED
REGIONAL HEARING
OFFICE

RCRA-05- 2003-0007

Dear Sir/Madam:

Enclosed is an Administrative Order (Order) for corrective action, which the United States Environmental Protection Agency hereby issues to Stewart Warner Corporation under the authority of Section 3008(h) of the Resource Conservation and Recovery Act (RCRA). It is our understanding that Commonwealth Legal Services is the registered agent for Stewart Warner.

This Order has been drafted to address documented releases of hazardous wastes and/or hazardous constituents at the referenced facility. U.S. EPA has determined that corrective action is necessary at the facility in order to protect human health and the environment.

On September 30, 2000, Stewart-Warner signed a Voluntary Corrective Action Agreement with the U.S. EPA. The Agreement called for Stewart-Warner to perform various tasks to address the corrective action requirements of RCRA. After performing certain activities outlined in the Agreement, Stewart-Warner terminated the Agreement by its letter of December 27, 2001. In order to ensure the protection of the human health and the environment, the U. S. EPA is issuing the subject administrative order.

The Order includes a set of Attachments: the Scope of Work for Interim Measures (as Attachment I), the Scope of Work for a RCRA Facility Investigation (as Attachment II), the Scope of Work for a Corrective Measures Study (as Attachment III), the Scope of

RCRA-05- 2003-0001

Work for Corrective Measures Implementation (as Attachment IV), Reference List (as Attachment V), the Region 5 RCRA Quality Assurance Project Plan (QAPP) Instructions, (as Attachment VI).

In accordance with 40 CFR § 24.05, this Order shall become final unless Stewart-Warner files a response and a request for a public hearing in writing no later than thirty (30) days after receipt of the Order. The response and request for hearing must be filed with:

Regional Hearing Clerk
U.S. EPA Region 5
77 W. Jackson Boulevard
Chicago, Illinois 60604-3590

A copy of the written response and request for hearing and copies of all subsequent documents filed in this action must be sent to:

Mr. Michael J McClary, Associate Regional Counsel
Office of Regional Counsel, (C-14J)
U.S. EPA Region 5
77 W. Jackson Boulevard
Chicago, Illinois 60604-3590

Additional information is provided in applicable regulations, 40 CFR Part 24 (copy enclosed) and Section XXIV of the Order.

If you have any questions about this letter, please contact Mr. McClary of the Office of Regional Counsel, at (312) 886-7163.

Sincerely yours,



for Joseph M. Boyle, Chief
Enforcement and Compliance Assurance Branch
Waste, Pesticides and Toxics Division
Enclosures

cc: Janine Landow Esser, Esq.
Quarles & Brady LLC
500 West Madison Street, Suite 3700
Chicago, Illinois, 60661-2511

V. Windle, Chief, Hazardous Waste Permit Section, IDEM

US ENVIRONMENTAL
PROTECTION AGENCY
REGION V

02 OCT 18 P2:33

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CLERK

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REGIONAL OFFICE

'02 OCT 15 P2:33

US ENVIRONMENTAL
PROTECTION AGENCY
REGION V

RCRA-05- 2003-0001

U.S. Environmental Protection Agency
RCRA §3008(h) ADMINISTRATIVE ORDER

for

Stewart-Warner Corporation
U.S. EPA I.D.# IND 005 213 715

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FIGURE

FACILITY LAYOUT/SOLID WASTE MANAGEMENT UNIT (Figure 1)

ATTACHMENTS

- I. SCOPE OF WORK FOR INTERIM MEASURES
- II. SCOPE OF WORK FOR A RCRA FACILITY INVESTIGATION
- III. SCOPE OF WORK FOR A CORRECTIVE MEASURES STUDY
- IV. SCOPE OF WORK FOR CORRECTIVE MEASURES IMPLEMENTATION
- V. REFERENCE LIST
- VI. RCRA QUALITY ASSURANCE PROJECT PLAN (QAPP) INSTRUCTIONS;
U.S. EPA REGION 5; REVISION APRIL 1998

ABBREVIATIONS AND ACRONYMS

AOC	Area of Concern
CAP	Corrective Action Plan
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CMI	Corrective Measure Implementation
CMS	Corrective Measure Study
DOCC	Description of Current Conditions
DQO	Data Quality Objective
HWMU	Hazardous Waste Management Unit
IM	Interim Measures
MCL	Maximum Contaminant Level
mg/kg	milligram per kilogram
mg/l	milligram per liter
NPDES	National Pollution Discharge Elimination System
PA	Preliminary Assessment
ppm	parts per million
ppb	parts per billion
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
RA	Release Assessment
RCRA	Resource Conservation and Recovery Act

RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
SOW	Scope of Work
SWMU(s)	Solid Waste Management Unit(s)
µg/kg	micrograms per kilogram
µg/l	micrograms per liter
U.S.C.	United States Code
U.S. EPA	United States Environmental Protection Agency
VSI	Visual Site Inspection

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION 5

IN THE MATTER OF:

Stewart-Warner Corporation
1541 Drover Street
Indianapolis, Indiana

U.S. EPA ID NO.
IND 005 213 715

RESPONDENT

RECEIVED
OCT 15 2002
REGIONAL HEARING CLERK
U.S. ENVIRONMENTAL
PROTECTION AGENCY

ADMINISTRATIVE ORDER

U.S. EPA Docket No.

Proceeding under Section
3008(h) of the Resource
Conservation and Recovery Act,
as amended, 42 U.S.C. §6928(h).

I. JURISDICTION

1. This Administrative Order (Order) is issued pursuant to the authority of the Administrator of the United States Environmental Protection Agency (U.S. EPA), by Section 3008(h) of the Solid Waste Disposal Act, commonly referred to as the Resource Conservation and Recovery Act of 1976, as amended by the Hazardous and Solid Waste Amendments of 1984, 42 U.S.C. § 928(h) (RCRA).
2. The Administrator's authority has been delegated to the Chief of the Enforcement and Compliance Assurance Branch of the Waste, Pesticides and Toxics Division, Region 5.
3. This Order is issued to Stewart-Warner Corporation (Respondent).
4. Respondent is the owner and operator of a facility at 1514 Drover Street, Indianapolis, Indiana (the Facility).

II. DEFINITIONS

Unless otherwise expressly provided herein, terms used in this Order, which are defined in RCRA or regulations promulgated under RCRA, shall have the definitions given to them in RCRA or in such regulations.

Acceptable, in the phrase "In a manner acceptable to U.S. EPA..." means that submittals or completed work meet the terms and conditions of this Order, attachments, scopes of work, approved workplans and/or U.S. EPA's written comments and guidance documents.

Additional work means any activity or requirement not expressly covered by this Order or its attachments, but determined by U.S. EPA to be necessary to fulfill the purposes of this Order, as presented in Section III: Statement of Purpose.

Administrative Record means the record compiled and maintained by U.S. EPA, in support of this Order.

Area of Concern (AOC) means any area of the Facility under Respondent's control or ownership where a release to the environment of hazardous waste(s) or hazardous constituents has occurred, is suspected to have occurred, or may occur, regardless of the frequency or duration of the release.

CERCLA means the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. §§ 9601, et seq.

Comply or compliance may be used interchangeably and mean the performance of work required by this Order of a quality approvable by U.S. EPA and in the manner and time specified in this Order or any modification thereof, its attachments or any modification thereof, or written U.S. EPA directives. Respondent must meet both the quality and timeliness components of a particular requirement to be considered in compliance with the terms and conditions of this Order.

Contractor includes any contractor, subcontractor, consultant, or laboratory retained to conduct or monitor any portion of the work performed pursuant to this Order.

Corrective measures mean those measures or actions necessary to control, prevent, or mitigate the release or potential release of hazardous waste or hazardous constituents into the environment.

Corrective Measures Implementation (CMI) means those activities necessary to initiate, complete, monitor, and maintain the remedies U.S. EPA has selected or may select to protect human health and/or the environment from the release or potential release of hazardous wastes, or hazardous constituents, into the environment from the Facility. The CMI requirements are detailed in Attachment IV, Scope of Work For Corrective Measures Implementation.

Corrective Measures Study (CMS) means the investigation and evaluation of potential remedies which will protect human health and/or the environment from the release or potential release of

hazardous wastes, or hazardous constituents, into the environment from the Facility. The CMS requirements are detailed in Attachment III, Scope of Work for a Corrective Measures Study.

Data Quality Objectives means the qualitative or quantitative statements expressing acceptable levels of uncertainty. The Data Quality Objective process is designed to collect data that is scientifically valid, defensible, and of known precision and accuracy relative to the use for which the data is obtained.

Day means a calendar day unless expressly stated to be a business day. Business day means a day other than a Saturday, Sunday, or Federal Holiday. In computing any period of time under this Order, where the last day falls on a Saturday, Sunday, or Federal Holiday, the period runs until the end of the next business day.

U.S. EPA means the United States Environmental Protection Agency, and any successor departments or agencies of the United States.

Facility means all contiguous property at and contiguous to the address provided in Section I.4. above, that is under Respondent's control.

Hazardous Constituents means those constituents listed in Appendix VIII of 40 C.F.R. Part 261, or any constituent identified in Appendix IX of 40 C.F.R. Part 264.

Hazardous Waste means hazardous waste, as defined in § 1004(5) of RCRA, 42 U.S.C. § 6903, or 40 C.F.R. § 260.10. This term includes hazardous constituents, as defined above.

Hazardous Waste Management Unit (HWMU) means a contiguous area of land on or in which hazardous waste is placed, or the largest area in which there is significant likelihood of mixing hazardous waste constituents in the same area. Examples of HWMUs include a surface impoundment, a waste pile, a land treatment area, a landfill cell, an incinerator, a tank and its associated piping and underlying containment system, and a container storage area. A container alone does not constitute a HWMU; the unit includes containers and the land or pad upon which they are placed.

Innovative Treatment Technologies means those technologies for treatment of soil, sediment, sludge, and debris other than incineration or solidification - stabilization and those technologies for treatment of groundwater contamination that are alternatives to pumping with conventional treatments like air stripping and ultraviolet light oxidation.

Interim measures (IM) means those actions, which can be initiated in advance of implementation of the final corrective action for the Facility, to achieve the goal of stabilization. The IM initiate cleanup at the Facility and control or eliminate the release or potential release of hazardous wastes at or from the Facility. The IM requirements are detailed in Attachment I, Scope of Work for Interim Measures.

RCRA Facility Investigation (RFI) means the investigation and characterization of the source(s) of contamination and the nature, extent, direction, rate, movement, and concentration of

the source(s) of contamination and releases of hazardous waste, including hazardous constituents, that have been or are likely to be released into the environment from the Facility. The activities required for the RFI are detailed in Attachment II, Scope of Work for a RCRA Facility Investigation.

Receptors means those humans, animals, or plants and their habitats which are or may be affected by releases of hazardous waste from or at the Facility.

Release means any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing of hazardous wastes or hazardous constituents into the environment.

Scope of Work (SOW) means the outline of work Respondent must use to develop all workplans and reports required by this Order, as set forth in this Order and its Attachments. All SOW Attachments and modifications or amendments thereto, are incorporated into, and are an enforceable part of, this Order.

Solid Waste Management Unit (SWMU) means any discernible unit at which solid wastes have been placed at any time irrespective of whether the unit was intended for the management of solid or hazardous waste. Such units include any area at a facility where solid wastes have been routinely and systematically released.

Stabilization means controlling or abating immediate threats to human health and/or the environment from releases and/or

preventing or minimizing the spread of contaminants while long-term corrective measures alternatives are being evaluated.

Submittal includes any workplan, report, progress report, or any other written document Respondent is required by this Order to send to U.S. EPA.

Violations of this Order mean those actions or omissions, failures or refusals to act by Respondent that result in a failure to meet the terms and conditions of this Order or its Attachments.

Work or Obligation means any activity Respondent must perform to comply with the requirements of this Order and its Attachments.

Workplan means the detailed plans prepared by Respondent to satisfy the requirements of the corresponding SOW. The requirements for each workplan are presented in Section VIII: Work to be Performed and/or the Attachments.

III. STATEMENT OF PURPOSE

This Order requires Respondent to:

1. Perform IM at the Facility to relieve threats to human health and/or the environment;
2. Complete an RFI to fully determine the nature and extent of any release of hazardous waste at or from the Facility;¹

¹ U.S. EPA recognizes that Respondent submitted a report on Phase I of the RFI, under a Voluntary Corrective Action Agreement, dated September 30, 2000. However, a complete delineation of the nature and extent of contamination in the soil and the groundwater is lacking in the RFI work performed to date. Further, the Phase I report has not addressed all of the potential sources and areas of contamination. U.S. EPA identified deficiencies in the previously submitted Phase I report, in a letter dated June 12, 2002.

3. Perform a CMS to identify and evaluate alternatives for the corrective measures necessary to prevent, mitigate, and/or remediate any releases of hazardous waste at or from the Facility;
4. Implement the corrective measure or measures selected by U.S. EPA at the Facility; and
5. Perform any other activities necessary to correct or evaluate actual or potential threats to human health and/or the environment resulting from the release or potential release of hazardous waste at or from the Facility.

IV. PARTIES BOUND

1. This Order applies to and is binding upon Respondent, Respondent's officers, directors, employees, agents, successors and assigns, heirs, trustees, receivers, and all persons, including but not limited to, contractors acting on behalf of Respondent.
2. No change in ownership, corporation, or partnership status relating to the Facility will, in any way, alter Respondent's responsibility under this Order.
3. No conveyance of title, easement, or other interest in the Facility, or a portion of the Facility, will, in any way, affect Respondent's obligations under this Order.
4. Respondent is responsible and liable for any failure to carry out all activities required by the terms and

conditions of this Order, regardless of Respondent's use of employees, agents, or contractors to perform any such tasks.

5. Respondent shall provide a copy of this Order to all contractors and laboratories retained to conduct or monitor any portion of the work performed pursuant to this Order within 14 days of the issuance of this Order or the retention of such person(s), whichever occurs later, and shall condition all such contracts on compliance with the terms of this Order.
6. Respondent shall give written notice of this Order to any successor in interest, prior to transfer of ownership or operation of the Facility or a portion thereof, and shall notify U.S. EPA in writing within 30 days prior to such transfer.

V. FINDINGS OF FACT

1. Respondent is a company doing business in the State of Indiana.
2. Respondent notified U.S. EPA of its hazardous waste activity, pursuant to § 3010 of RCRA, 42 U.S.C. § 6930.
3. In a notification dated August 18, 1980, Respondent identified itself as a generator of hazardous waste and an owner/operator of a treatment, storage, and/or disposal facility for hazardous waste.

4. Respondent owned and/or operated the Facility as a hazardous waste management facility on or after November 19, 1980, the applicable date which renders facilities subject to interim status requirements or the requirement to have a permit under §§ 3004 and 3005 of RCRA, 42 U.S.C. §§ 6924 and 6925.
5. On November 18, 1980, Respondent submitted Part A of its hazardous waste management permit application to continue operating two hazardous waste storage units after November 19, 1980.
6. Respondent stated that it handled the following hazardous wastes at the Facility:
 - a. Hazardous wastes exhibiting the characteristics of corrosivity, identified at 40 C.F.R. § 261.22 (Waste Code D002);
 - b. Hazardous wastes from non-specific sources, identified at 40 C.F.R. § 261.31 (Waste Codes F001, F002, F003, F005, F007, F008, and F017);
 - c. Hazardous wastes from specific sources, identified at 40 C.F.R. § 261.32 (Waste Code K062); and
 - d. Commercial chemical products, manufacturing chemical intermediates, off-specification commercial chemical products, or manufacturing chemical intermediates, identified at 40 C.F.R. § 261.33(e) (Waste Codes P030 and P106), or at 40 C.F.R. § 261.33(f) (Waste Codes U002, U154, U210, U220, U226, U228, and U239).

7. On June 28, 1982, Respondent sent a letter to U.S. EPA withdrawing its permit application, claiming that the application had been filed in error, and that Respondent had not treated, stored or disposed of hazardous waste stored hazardous waste since November 19, 1980.
8. Respondent claimed that it had only handled hazardous waste in containers and tanks for less than 90 days, an activity which does not require a permit or interim status.
9. On November 16, 1982, U. S. EPA acknowledged receipt of Respondent's letter dated June 28, 1982.
10. Respondent conducted treatment, storage, or disposal (TSD) and accumulation of hazardous waste at the Facility after November 19, 1980.
11. Indiana Department of Environmental Management (IDEM) conducted an inspection of the Facility on February 12, and February 15, 1988.
12. IDEM reported that at the time of the inspection, approximately 30 containers of hazardous waste remained at the Facility for over 90 days.
13. The same containers were at the Facility during an inspection in April of 1986.
14. IDEM also noted other RCRA violations.
15. The Facility (see Figure 1):
 - a. is located on approximately 23 acres of land,

- b. is bordered by Drover Street to the east and the Belt Railroad Co. to the south,
- c. is located in an industrial and residential area,
- d. has residences located to the north and to the west,
- e. has adjacent industries, including National Starch and Chemical Co. to the east, and Eli Lilly Co. to the south and west,
- f. began operations in 1935, and was engaged in the business of manufacturing heat exchangers and heaters primarily for airplanes,
- g. consisted of major production processes, including punching, milling, grinding and machining,
- h. was used as an automotive manufacturing facility, prior to 1935,
- i. is located on a glacial outwash aquifer, which consists primarily of sand and/or gravel with discontinuous, interbedded layers of finer grained silt and clay², and
- j. is located approximately 1/4 mile west of the White River.

² These silty clay lenses reportedly reduce the horizontal transmissivity of the aquifer and also reduce the vertical hydraulic conductivity. Where the vertical hydraulic conductivity is sufficient, localized, semi-confined groundwater conditions may be found. The outwash aquifer extends to the depth of bedrock. The depth to ground water is approximately 25 feet and may fluctuate seasonally with varying amounts of precipitation. Groundwater flow is generally east-southeast towards the White River. However, local groundwater flow may have been influenced by the use of high capacity pumping wells located near the site.

16. Respondent ceased manufacturing operations at the Facility in December of 1989, and dismantled and transferred equipment and most of its manufacturing operations to its Troy and Tell City, Indiana, facilities.
17. A Preliminary Assessment/Visual Site Inspection (PA/VSI), completed on August 21, 1998, identified the following four SWMUs at the Facility (see Figure 1):
 - a. Former aboveground storage tank (SWMU 1), consisted of a 1,000-gallon steel above-ground storage tank for storage of liquid wastes. SWMU 1 did not have secondary containment. Respondent submitted a closure plan in accordance with a March 17, 1989, Agreed Order with IDEM, which was approved on September 19, 1989. Releases of perchloroethylene (PCE), trichloroethylene (TCE), and other hazardous constituents were documented during the closure sampling. PCE concentrations in the soil around the tank ranged from 93 parts per billion (ppb) to 4,200 ppb. TCE was detected in the soil in concentrations up to 670 ppb.
 - b. Former waste storage area (SWMU 2), consisted of a drum storage area measuring approximately 30-feet long by 30-feet wide, which was used for storing 55-gallon containers of liquid or solid wastes. The area was paved, but did not have secondary containment. Respondent submitted a closure plan in accordance with

the March 17, 1989, Agreed Order with IDEM, which was approved on September 28, 1989. Releases of PCE, TCE, and other hazardous constituents were documented during the closure sampling. PCE was detected in the soil around the unit in concentrations up to 130,000 ppb. TCE was detected in the soil in concentrations up to 13,000 ppb.

- c. Former waste oil underground storage tank (UST) (SWMU 3), consisted of a 10,000-gallon steel UST used for storing waste oil. At the time the tank was removed, Hoosier Environmental Services (now August Mack, Inc.) reported that there was no evidence that the tank was leaking. U.S. EPA has no reports of soil sampling in the immediate vicinity of this unit.
- d. Former satellite accumulation areas (SWMU 4), located inside Respondent's former Main Manufacturing Building. Six accumulation areas, each consisting of one 55-gallon drum, were located adjacent to each of the six paint spray booths. Another accumulation area was located near Respondent's anodizing plating tanks. Accumulation areas were also located near each of the vapor degreasers and near a flushing degreaser. Once a satellite accumulation drum was filled, it was taken to SWMU 2.

18. In the PA/VSI final report, three AOCs were identified as follows:

- a. Seven other former USTs (AOC A), for storing fuel products such as gasoline, diesel fuel, aviation fuel and white gas. There were three 1,000-gallon tanks, two 500-gallon tanks, and two 280-gallon tanks. All of these tanks were constructed of steel, and were approximately 40 years of age at the time they were removed. U.S. EPA has no reports of soil or groundwater sampling in the immediate vicinity of these tanks.
- b. Former Polychlorinated Biphenyl (PCB)-impacted area (AOC B), where capacitors containing PCBs were stored. A documented release occurred in 1996, when vandals stole copper from the capacitors, spilling PCB-contaminated oil onto a paved area in the process. Samples of the soil below the pavement were taken and analyzed. One sample was found to contain 25.67 ppm of PCBs, and approximately 20-cubic yards of soil and debris was removed for off-site disposal.
- c. Former heat treatment and pressurization pits (AOC C), consisted of several concrete pits or sumps in the floor of the former Long Building. The pits varied in size from 384 to 2,400 cubic feet. The pits contained wastewater, probably contaminated with acids. The pits

were backfilled with gravel and demolition debris, and their integrity has not be determined.

19. On September 30, 2000, Respondent entered into a Voluntary Corrective Action Agreement (VCA) with U.S. EPA, in which Respondent agreed to take corrective action for its past releases.
20. On February 14, 2001, Respondent submitted documents entitled "Final RCRA Corrective Action Environmental Indicators" Report and "Phase I RCRA Facility Investigation Report," pursuant to the VCA.
21. Respondent reported the existence of another AOC, called the Suspect UST Farm (AOC D). In 1990, Versar conducted a magnetometer survey over a small portion of the site to investigate for the possible presence of UST. This area was surveyed based on a 1939 site plan. Versar interpreted the survey data to identify seven USTs: three 10,000-gallon gasoline tanks, one 9,000-gallon coal oil tank, one 15,000-gallon fuel oil tank, one 11,200-gallon coal oil tank, and one 7,500-gallon motor oil tank. By excavating exploratory test pits, Respondent confirmed the locations of five of the USTs. U.S. EPA has no reports of soil or groundwater sampling in the immediate vicinity of these tanks.
22. Respondent also reported detection of the following elevated levels in the groundwater:

- a. concentrations up to 24,000 ppb of PCE and up to 1,400 ppb of TCE, and
 - b. concentrations of selenium, arsenic, and other hazardous constituents were detected in the soils at SWMU 1 and SWMU 2, at levels which exceeded the health-based screening levels identified by Respondent.
23. Releases to the groundwater from the Facility have migrated under a residential area and into the basement dewatering system of the adjacent Eli Lilly facility.
24. The presence of the hazardous wastes identified above may pose a threat to human health or the environment.
25. PCE (also known as tetrachloroethylene) and TCE are volatile organic constituents which have both been shown to cause cancer in laboratory animals, and probably cause cancer in humans.
26. Water containing either PCE or TCE in concentrations greater than 5 ppb should not be used as a source of drinking water.
27. Inorganic arsenic has been recognized as a human poison since ancient times, which can produce death in large doses, and is known to cause cancer in humans in lower doses.
28. Selenium can cause rashes, heat, swelling, and pain upon contact with skin. Breathing selenium dust can cause dizziness, fatigue, and irritation of mucous membranes. In extreme cases, collection of fluid in the lungs (pulmonary edema) and severe bronchitis have been reported. Accidental

swallowing of selenium over a long period of time can cause a loss of feeling and control in arms and legs. If mildly excessive amounts of selenium is ingested over long periods of time, brittle hair and deformed nails can develop.

29. On December 27, 2001, Respondent unilaterally terminated the VCA.

VI. CONCLUSION OF LAW AND DETERMINATIONS

Based on the Findings of Fact set forth above and after consideration of the Administrative Record, the Chief of the Enforcement and Compliance Assurance Branch, Waste, Pesticides and Toxics Division, U.S. EPA, Region 5, has made the following conclusions of law and determinations:

1. Respondent is a "person," within the meaning of Section 1004(15) of RCRA, 42 U.S.C. § 6903(15), and 40 C.F.R. § 260.10;
2. Respondent is the owner or operator of a facility that has operated, is operating, should be, or should have been operating under interim status, subject to § 3005(e) of RCRA, 42 U.S.C. § 6925(e);
3. Certain wastes found at the Facility are hazardous wastes pursuant to §§ 1004(5) and 3001 of RCRA, 42 U.S.C. §§ 6903(5) and 6921, 40 C.F.R. Part 261, and Subpart S;
4. There is or has been a release of hazardous waste(s) into the environment from the Facility; and

5. The actions required by this Order are necessary to protect human health and/or the environment.

VII. WORK TO BE PERFORMED

1. Pursuant to § 3008(h) of RCRA, 42 U.S.C. § 6928, Respondent is ordered to perform the acts specified in this Order, in the manner and by the dates specified herein.
2. All work undertaken pursuant to this Order must be performed in a manner consistent with, at a minimum: the attached Scopes of Work; all U.S. EPA-approved workplans; RCRA and other applicable Federal laws and their implementing regulations; and applicable U.S. EPA guidance documents.
3. Guidance may include, but is not limited to, documents listed in Attachment V: References.
4. **PROJECT COORDINATOR**
 - a. Within 15 days of the effective date of this Order, U.S. EPA and Respondent shall each designate a Project Coordinator.
 - b. Respondent shall notify U.S. EPA in writing of the designated Project Coordinator.
 - c. Each Project Coordinator shall be responsible for overseeing the implementation of this Order and for designating a person to act in their absence.
 - d. U.S. EPA's Project Coordinator will be U.S. EPA's designated representative for the Facility.

- e. To the maximum extent practicable, all communications between Respondent and U.S. EPA, and all documents, reports, approvals, and other correspondence concerning the activities performed pursuant to this Order shall be directed through the Project Coordinators.
 - f. Respondent may change its Project Coordinator but agrees to provide at least 14 days written notice prior to changing the Project Coordinator.
 - g. Respondent shall notify U.S. EPA within 5 days of any unanticipated change in the Project Coordinator.
 - h. The absence of U.S. EPA's Project Coordinator from the Facility shall not be cause for the stoppage of work.
5. **INTERIM MEASURES** - Respondent shall implement IM to protect human health and the environment, and shall, at a minimum, perform the following tasks:
- a. Submit for approval to U.S. EPA within 60 days after the effective date of this Order, an IM Work Plan, developed in a manner consistent with Attachment I;
 - b. Evaluate technologies such as air sparging/soil vapor extraction and groundwater extraction & treatment;
 - c. Provide a cost estimate for the IM implementation;
 - d. Propose an IM to meet the objectives described below, as well as a method to evaluate the effectiveness in

meeting those objectives and a cost estimate for its implementation;

e. Attain the following objectives:

i. Stop the migration of contaminated groundwater across the Facility property lines, and

ii. Stop and prevent all human exposures to the contaminated groundwater;

f. Complete the construction and begin operation of the IM within 240 days after the effective date of this Order.

6. **RCRA FACILITY INVESTIGATION** - Respondent shall submit to U.S. EPA:

a. A Description of Current Conditions (DOCC) Report, developed in a manner consistent with Attachment II, within 30 days of the effective date of this Order. The DOCC Report is for U.S. EPA's review and comment and not subject to Section IX: Agency Approvals/Proposed Contractor.

b. An RFI Workplan, developed in a manner consistent with Attachment II, within 90 days of the effective date of this Order, which shall detail the methodology Respondent will use to:

i. Gather data needed to make decisions on stabilization during the early phase of the RFI;

- ii. Identify and characterize all sources of contamination;
 - iii. Define the degree and extent of contamination;
 - iv. Characterize the potential pathways of contaminant migration;
 - v. Identify actual or potential human and/or ecological receptors; and
 - vi. Support the development of alternatives from which a corrective measure will be selected by U.S. EPA.
- c. A specific schedule for implementation of all activities in the RFI Workplan.
 - d. An RFI Report for approval in accordance with the U.S. EPA-approved RFI Workplan schedule.

7. CORRECTIVE MEASURES STUDY

- a. Respondent shall submit to U.S. EPA a CMS, developed in a manner consistent with Attachment III, within 90 days of U.S. EPA approval of the RFI Report.
- b. The CMS shall detail the methodology for developing and evaluating potential corrective measures to remedy any contamination exceeding Media Cleanup Standards³ at or from the Facility.
- c. The CMS shall identify the potential corrective measures, including any innovative technologies, that

³ Media Cleanup Standards are described in Attachments II and III.

may be used for the containment, treatment and/or disposal of contamination.

- d. U.S. EPA will provide the public with an opportunity to review and comment on the final draft of the CMS and a description of U.S. EPA's proposed corrective measure(s), including U.S. EPA's justification for proposing such corrective measure(s) (Statement of Basis) and an opportunity for a public meeting regarding U.S. EPA's proposed cleanup standards and remedy for the Facility.
- e. Following the public comment period, U.S. EPA will issue its decision on corrective measure(s) for the protection of human health and/or the environment. U.S. EPA will also issue a Response to Comments received during the public comment period.

8. CORRECTIVE MEASURES IMPLEMENTATION

- a. Respondent shall submit to U.S. EPA a CMI Workplan within 60 days of U.S. EPA's decision on the corrective measure(s).
- b. The CMI Workplan shall be designed to facilitate the design, construction, operation, maintenance, and monitoring of corrective measures at the Facility in manner consistent with Attachment IV.

- c. Respondent shall submit CMI reports to U.S. EPA in accordance with the U.S. EPA-approved CMI Workplan schedule.

9. ADDITIONAL WORK

- a. U.S. EPA may determine, or Respondent may propose, that certain tasks, including, but not limited to investigatory work, engineering evaluation, or procedure/methodology modifications, are necessary in addition to or in lieu of the tasks included in any U.S. EPA-approved workplan, when such additional work is necessary to meet the purposes set forth in Section III: Statement of Purpose.
- b. U.S. EPA will notify Respondent in writing and specify the basis for its determination that additional work is necessary.
- c. Within 30 days after receipt of such determination, Respondent shall have the opportunity to meet or confer with U.S. EPA to discuss the additional work.
- d. If required by U.S. EPA, Respondent shall submit for U.S. EPA approval a workplan for the additional work. U.S. EPA shall specify the contents of such workplan. Such workplan shall be submitted within 30 days of receipt of U.S. EPA's determination that additional

work is necessary, or according to an alternative schedule established by U.S. EPA.

VIII. AGENCY APPROVALS/PROPOSED CONTRACTOR

1. U.S. EPA will provide Respondent with written approval, approval with conditions and/or modifications, disapproval, or disapproval with comments, for any workplan, report (except progress reports), specification, or schedule submitted pursuant to or required by this Order.
2. U.S. EPA will provide a statement of reasons for any approval with conditions and/or modifications, disapproval, or disapproval with comments.
3. Within 45 days of receipt of U.S. EPA's disapproval, or disapproval with comments, Respondent shall revise and submit an approvable workplan, report, specification, or schedule, in accordance with U.S. EPA's written comments.
4. Any such disapproval, or disapproval with comments, of a revised and resubmitted workplan, report, specification, or schedule, shall be deemed a violation of this Order and subject Respondent to the stipulated penalties provision found at Section XXIII, unless waived by U.S. EPA.
5. Upon receipt of U.S. EPA's written approval, or approval with conditions and/or modifications, Respondent shall commence work and implement any approved workplan in

accordance with the schedule and provisions contained therein.

6. Any U.S. EPA-approved report, workplan, specification, or schedule, shall be deemed incorporated into this Order.
7. Prior to written approval, no workplan, report, specification, or schedule, shall be construed as approved and final. Oral advice, suggestions, or comments given by U.S. EPA representatives will not constitute an official approval, nor shall any oral approval or oral assurance of approval be considered as binding.
8. All work performed pursuant to this Order shall be under the direction and supervision of a professional engineer, hydrologist, geologist, or environmental scientist with expertise in hazardous waste or contaminated soil and groundwater site cleanup.
9. Respondent's contractor shall have the technical expertise sufficient to adequately perform all aspects of the work for which it is responsible.
10. Respondent shall notify U.S. EPA, in writing, of the name, title, and qualifications of the principal engineer, hydrologist, geologist, or environmental scientist to be used in carrying out the terms of this Order within 14 days of the effective date of this Order.

11. Respondent shall identify whether any contractor is on the List of Parties Excluded for Federal Procurement or Non-Procurement Programs.
12. U.S. EPA reserves the right to disapprove Respondent's contractor at any time during the period that the Order is effective.
13. If U.S. EPA disapproves a contractor, Respondent must notify U.S. EPA, in writing, of the name, title and qualifications of any replacement, within 30 days of receipt of U.S. EPA's of written notice of disapproval.

IX. QUALITY ASSURANCE

1. Respondent shall follow U.S. EPA guidance for sampling and analysis.
2. Workplans shall contain quality assurance/quality control (QA/QC) and chain of custody procedures for all sampling, monitoring, and analytical activities. Any deviations from the QA/QC and chain of custody procedures in approved workplans must be approved by U.S. EPA prior to implementation; must be documented, including reasons for the deviations; and must be reported in the applicable report.
3. The name(s), addresses, and telephone numbers of the analytical laboratories Respondent proposes to use must be specified in the applicable workplan(s).

4. All workplans required under this Order shall include data quality objectives for each data collection activity to ensure that data of known and appropriate quality are obtained and that data is sufficient to support their intended use(s).
5. Respondent shall monitor to ensure that high quality data is obtained by its consultant or contract laboratories.
6. Respondent shall ensure that the laboratories used, perform analyses according to the latest approved edition of "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (SW-846 Third Edition inclusive of Final updates I, II, IIa, IIb, III, and any subsequent updates), or other methods deemed satisfactory to U.S. EPA.
7. If methods other than U.S. EPA methods are to be used, Respondent shall specify all such protocols in the applicable workplan.
8. U.S. EPA may reject any data that does not meet the requirements of the approved workplan or U.S. EPA analytical methods and may require re-sampling and additional analyses.
9. Respondent shall ensure that laboratories used for analyses participate in a QA/QC program equivalent to that which is followed by U.S. EPA.
10. U.S. EPA may conduct a performance and QA/QC audit of the laboratories chosen by Respondent before, during, or after sample analyses.

11. Upon request by U.S. EPA, Respondent shall have the chosen laboratory perform analyses of samples provided by U.S. EPA to demonstrate laboratory performance.
12. If the audit reveals deficiencies in a laboratory's performance or QA/QC, re-sampling and additional analyses may be required.

X. SAMPLING AND DATA/DOCUMENT AVAILABILITY

1. Respondent shall submit to U.S. EPA, upon request, the results of all sampling and/or tests or other data generated by divisions, agents, or contractors pursuant to this Order.
2. Notwithstanding any other provisions of this Order, U.S. EPA retains all of its information gathering and inspection authorities and rights, including the right to bring enforcement actions related thereto, under RCRA, CERCLA, and any other applicable statutes or regulations.
3. Respondent shall notify U.S. EPA in writing at least 14 days prior to beginning each separate phase of field work approved under any workplan required by this Order.
4. If Respondent believes it must commence emergency field activities without delay, Respondent may seek emergency telephone authorization from the U.S. EPA Project Coordinator or, if the U.S. EPA Project Coordinator is unavailable, their Section Chief, to commence such activities immediately.

5. At the request of U.S. EPA, Respondent shall provide or allow U.S. EPA or its authorized representative to take split or duplicate samples of all samples collected by Respondent pursuant to this Order. Similarly, at the request of Respondent, U.S. EPA shall allow Respondent or its authorized representative(s) to take split or duplicate samples of all samples collected by U.S. EPA under this Order.
6. Respondent may assert a business confidentiality claim covering all or part of any information submitted to U.S. EPA pursuant to this Order. Any assertion of confidentiality must be accompanied by information that satisfies the items listed in 40 C.F.R. 2.204(e)(4) or such claim shall be deemed waived. Information determined by U.S. EPA to be confidential shall be disclosed only to the extent permitted by 40 C.F.R. Part 2.
7. If no such confidentiality claim accompanies the information when it is submitted to U.S. EPA, the information may be made available to the public by U.S. EPA, without further notice to Respondent.
8. Physical or analytical data shall not be deemed confidential.

XI. ACCESS

1. U.S. EPA, its contractors, employees, and/or any duly designated U.S. EPA representatives, is authorized to enter and freely move about the Facility pursuant to this Order for the purposes of:
 - a. Interviewing Facility personnel and contractors;
 - b. Inspecting records, operating logs, and contracts related to the Facility;
 - c. Reviewing Respondent's progress in carrying out the terms of this Order;
 - d. Conducting such tests, sampling, or monitoring as U.S. EPA deems necessary;
 - e. Using a camera, sound recording, or other documentary type equipment; and
 - f. Verifying reports and data submitted to U.S. EPA by Respondent.
2. Respondent shall provide U.S. EPA, and its representatives, access at all reasonable times to the Facility, and subject to paragraph XI.3 below, to any other property to which access is required for implementation of this Order.
3. Respondent shall permit such persons to inspect and copy all records, files, photographs, documents, including all sampling and monitoring data, that pertain to work undertaken pursuant to this Order and that are within the

possession or under the control of Respondent or its contractors.

4. To the extent that work being performed pursuant to this Order must be done beyond the Facility boundary, Respondent shall use its best efforts to obtain access agreements necessary to complete work required by this Order from the present owner(s) of such property within 30 days of the date that the need for access becomes known to Respondent. Best efforts as used in this paragraph shall include, at a minimum, a certified letter from Respondent to the present owner(s) of such property requesting access agreement(s) to permit Respondent and its authorized representatives access to such property, and the payment of reasonable compensation in consideration of granting access. Any such access agreement shall provide for access by U.S. EPA and its representatives. Respondent shall insure that U.S. EPA's Project Coordinator has a copy of any access agreement(s).
5. In the event that an agreement for access is not obtained within 30 days of approval of any workplan for which access is required, or of the date that the need for access became known to Respondent, Respondent shall notify U.S. EPA in writing within 14 days thereafter of both the efforts undertaken to obtain access and the failure to obtain access agreements.

6. U.S. EPA may, at its discretion, assist Respondent in obtaining access. In the event U.S. EPA obtains access, Respondent shall undertake U.S. EPA-approved work on such property.
7. Nothing in this section limits or otherwise affects U.S. EPA's right of access and entry pursuant to applicable law, including RCRA and CERCLA.
8. Nothing in this section shall be construed to limit or otherwise affect Respondent's liability and obligation to perform corrective action including corrective action beyond the Facility boundary, notwithstanding the lack of access.

XII. RECORD PRESERVATION

1. Respondent shall retain, during the pendency of this Order, and for a minimum of 6 years after its termination, all data, records, and documents now in its possession or control, or which come into its possession or control, which relate in any way to this Order or to hazardous waste management and/or disposal at the Facility.
2. Respondent shall notify U.S. EPA, in writing, 90 days prior to the destruction of any such records, and shall provide U.S. EPA with the opportunity to take possession of any such records. Such written notification shall reference the effective date, caption, and docket number of this Order and shall be addressed to:

Project Coordinator for Stewart-Warner Corp.
Enforcement and Compliance Assurance Branch
Waste, Pesticides and Toxics Division (DE-9J)
U.S. EPA, Region 5
77 West Jackson Blvd.
Chicago, IL 60604

3. Respondent shall, within 30 days of retaining or employing any agent, or contractor for the purpose of carrying out the terms of this Order, enter into an agreement with any such agents or contractors whereby such agents or contractors are required to provide Respondent a copy of all documents produced pursuant to this Order.
4. All documents pertaining to this Order shall be stored by Respondent in a centralized location at the Facility to afford ease of access by U.S. EPA or its representatives.

XIII. REPORTING AND DOCUMENT CERTIFICATION

1. Beginning with the first full month following the effective date of this Order, and throughout the period that this Order is effective, Respondent shall provide U.S. EPA with monthly progress reports, due by the tenth day of each month (reports previous month's progress).
2. The progress reports shall conform to requirements in the relevant SOW, contained in the Attachments.
3. U.S. EPA may adjust the frequency of progress reports to be consistent with site-specific activities.
4. Three copies of all documents submitted pursuant to this Order shall be hand-delivered or sent by certified mail,

return receipt requested, or by overnight express mail, to the U.S. EPA Project Coordinator designated pursuant to Section VII of this Order. Other addresses and additional copies (e.g., state EPA) can also be designated by the U.S. EPA Project Coordinator. All documents submitted pursuant to this Order shall be printed on recycled paper and shall be copied double-sided whenever practicable.

5. Any report or other document submitted by Respondent pursuant to this Order which makes any representation concerning Respondent's compliance or noncompliance with any requirement of this Order shall be certified by a responsible corporate officer⁴ of Respondent or a duly authorized representative, in the following form:

"I certify that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to evaluate the information submitted. I certify that the information contained in or accompanying this submittal is true, accurate, and complete. As to those identified portion(s) of this submittal for which I cannot personally verify the accuracy, I certify that this submittal and all attachments were prepared in accordance with procedures designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those directly responsible for gathering the information, or the immediate supervisor of such person(s), the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting

⁴ A responsible corporate officer means: a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation.

false information, including the possibility of fine and imprisonment for knowing violations."

Signature: _____
Name: _____
Title: _____
Date: _____

XIV. RESERVATION OF RIGHTS

1. U.S. EPA reserves all statutory and regulatory powers, authorities, rights, and remedies, both legal and equitable, which may pertain to Respondent's failure to comply with any of the requirements of this Order, including without limitation the assessment of penalties under § 3008(h)(2) of RCRA, 42 U.S.C. § 6928(h)(2).
2. This Order shall not be construed as a covenant not to sue, release, waiver, or limitation of any rights, remedies, powers, and/or authorities, civil or criminal, which U.S. EPA has under RCRA, CERCLA, or any other statutory, regulatory, or common law authority of the United States.
3. U.S. EPA reserves the right to perform any portion of the work consented to herein or any additional site characterization, feasibility study, and remedial work as it deems necessary to protect human health and/or the environment.
4. U.S. EPA may exercise its authority under CERCLA to undertake response actions at any time. In any event, U.S. EPA reserves its right to seek reimbursement from Respondent

for costs incurred by the United States. Notwithstanding compliance with the terms of this Order, Respondent is not released from liability, if any, for the costs of any response actions taken or authorized by U.S. EPA.

5. If U.S. EPA determines that activities in compliance or noncompliance with this Order have caused or may cause a release of hazardous waste or hazardous constituent(s), or a threat to human health and/or the environment, or that Respondent is not capable of undertaking any of the work ordered, U.S. EPA may order Respondent to stop further implementation of this Order for such period of time as U.S. EPA determines may be needed to abate any such release or threat and/or to undertake any action which U.S. EPA determines is necessary to abate such release or threat.
6. This Order is not intended to be, nor shall it be, construed to be a permit.
7. U.S. EPA's approval of a SOW or any final workplan does not constitute a warranty or representation that the SOW or workplan will achieve the required cleanup or performance standards.
8. Respondent's compliance with the terms of this Order shall not relieve Respondent of its obligations to comply with RCRA or any other applicable local, State, or Federal laws and regulations.

9. Notwithstanding any other provision of this Order, no action or decision by U.S. EPA pursuant to this Order, including without limitation, decisions of the Regional Administrator, the Director of the Waste, Pesticides and Toxics Division, or any authorized representative of U.S. EPA, shall constitute final agency action giving rise to any right of judicial review prior to U.S. EPA's initiation of a judicial action to enforce this Order, including an action for penalties or an action to compel Respondent's compliance with the terms and conditions of this Order.
10. In any action brought by U.S. EPA for a violation of this Order, Respondent shall bear the burden of proving that U.S. EPA's actions were arbitrary and capricious and not in accordance with law.
11. In any subsequent administrative or judicial proceeding initiated by U.S. EPA for injunctive or other appropriate relief relating to the Facility, Respondent shall not assert, and may not maintain, any defense or claim based upon the principles of waiver, res judicata, collateral estoppel, issue preclusion, claim-splitting, or other defenses based upon any contention that the claims raised by U.S. EPA in the subsequent proceeding were, or should have been, raised in the present matter.

XV. OTHER CLAIMS

Nothing in this Order shall constitute, or be construed as, a release from any claim, cause of action, demand, or defense in law or equity, against any person, firm, partnership, or corporation for any liability it may have arising out of or relating in any way to the generation, storage, treatment, handling, transportation, release, or disposal of any hazardous constituents, hazardous substances, hazardous wastes, pollutants, or contaminants found at, taken to, or taken or migrating from the Facility.

XVI. OTHER APPLICABLE LAWS

1. All actions required pursuant to this Order shall be undertaken in accordance with the requirements of all applicable local, State, and Federal laws and regulations.
2. Respondent shall obtain or cause its representatives to obtain all permits and approvals necessary under such laws and regulations.

XVII. INDEMNIFICATION OF THE UNITED STATES GOVERNMENT

1. Respondent shall indemnify and save and hold harmless the United States Government, its agencies, departments, agents, and employees, from any and all claims or causes of action arising from or on account of acts or omissions of Respondent or its officers, employees, agents, independent

contractors, receivers, trustees, and assigns in carrying out activities required by this Order.

2. This indemnification shall not be construed in any way as affecting or limiting the rights or obligations of Respondent or the United States under their various contracts.

XVIII. FINANCIAL RESPONSIBILITY

1. Respondent shall provide financial assurance for the IM implementation within 240 days of the effective date of this Order.
2. Respondent shall provide financial assurance for the implementation of the corrective measure(s) within 90 days of U.S. EPA's selection of the final corrective measure(s).
3. Respondent shall establish the financial assurance from among one or more of the following:
 - a. A trust fund;
 - b. A surety bond;
 - c. A letter of credit;
 - d. Insurance; or
 - e. A financial test and corporate guarantee.
4. The wording and terms of the financial assurance instrument(s) shall be subject to U.S. EPA approval.

XIX. MODIFICATION

1. This Order may only be modified by U.S. EPA to ensure protection of human health and the environment.
2. Such modifications shall be in writing, shall have as their effective date the date on which they are signed by U.S. EPA, and shall be incorporated into this Order.
3. Any request by Respondent for a compliance date modification and/or revision of an approved workplan requirement must be made in writing and be received by U.S. EPA at least 10 days prior to applicable deadline. Such requests must provide justification for any proposed compliance date modification or workplan revision. U.S. EPA has no obligation to approve such requests, but if it does so, such approval and the modification or revision must be in writing from U.S. EPA's Project Coordinator.
4. Any approved compliance date modification shall be incorporated by reference into this Order. Such a modification would not alter other due dates, unless so stated by U.S. EPA in its written approval, modification, or revision.
5. No informal advice, guidance, suggestions or comments by U.S. EPA regarding reports, plans, specifications, schedules or any other writing submitted by Respondent will be

construed as relieving Respondent of its obligation to obtain written approval, if and when required by this Order.

XX. SEVERABILITY

If any provision or authority of this Order or the application of this Order to any party or circumstances is held by any judicial or administrative authority to be invalid, the application of such provisions to other parties or circumstances and the remainder of this Order shall remain in force and shall not be affected thereby.

XXI. SURVIVABILITY

1. Except as otherwise expressly provided in this section, this Order shall survive the issuance or denial of a RCRA permit for the Facility, and this Order shall continue in full force and effect after either the issuance or denial of such permit. Accordingly, Respondent shall continue to be liable for the performance of obligations under this Order notwithstanding the issuance or denial of such permit.
2. If Respondent is issued a RCRA permit for the Facility that expressly incorporates all or a part of the requirements of this Order, or expressly states that its requirements are intended to replace some or all of the requirements of this Order, Respondent may request a modification of this Order and shall, with written U.S. EPA approval, be relieved of liability under this Order for those specific obligations.

XXII. SUBMITTAL SUMMARY

Table 1, as follows, is a summary of the major deadlines required by this Order. To the extent that this section is inconsistent with any other section of this Order, such other section, rather than this summary, shall prevail.

Table 1
Submittal Summary

SECTION	ACTION	DUE DATE
IV.6	Notify U.S. EPA of transfer of ownership	30 days prior to such scheduled transfer
VII.4	Designate a Project Coordinator and notify U.S. EPA in writing	Within 15 days of the effective date of the Order
VII.5.a	Submit IM Workplan	Within 60 days of the effective date of the Order
VII.5.f	Complete construction and begin operation of IM	Within 240 days of the effective date of this Order
VII.6.a	Submit DOCC Report	Within 30 days of the effective date of this Order
VII.6.b	Submit RFI Workplan	Within 90 days of the effective date of this Order
VII.6.d	Submit RFI Report	As scheduled in approved RFI Workplan
VII.7.a	Submit CMS Report	Within 90 days of receipt of U.S. EPA approval of RFI Report
VII.8.a	Submit CMI Workplan	Within 60 days of notification of U.S. EPA's selection of corrective measure(s)

Table 1
Submittal Summary

SECTION	ACTION	DUE DATE
VII.8.c	Submit CMI Report	As scheduled in approved CMI Workplan
VII.9.d	Submit workplan for additional work	If necessary, within 30 days of receipt of U.S. EPA determination
VIII.3	Revise and Submit document disapproved or disapproved with comments	Within 45 days of receipt of U.S. EPA's document disapproval or disapproval with comments
VIII.9	Notify U.S. EPA in writing of proposed contractor(s)	Within 14 days of the effective date of the Order
X.3	Notify U.S. EPA prior to beginning each separate phase of field work	14 days prior to beginning field activities
XI.4	Obtain access agreements	If necessary, within 30 days of approval of workplan where access is required
XII.2	Notify U.S. EPA prior to destruction of documents or records that relate to this Order	90 days prior to destruction
XIII.1	Submit monthly progress reports	On the tenth day of each month

XXIII. PENALTIES FOR NONCOMPLIANCE

If Respondent fails to comply with the terms and provisions of this Order, U.S. EPA may commence an action to require compliance

and assess a civil penalty not to exceed \$27,500 for each day of non-compliance, or issue another Order.

XXIV. NOTICE OF OPPORTUNITY TO REQUEST A HEARING

1. In accordance with Section 3008(b) of RCRA, 42 U.S.C. § 6928(b), this Order shall become final unless Respondent files a response and requests a public hearing in writing no later than 30 days after service of the Order and Notice of Opportunity for Hearing.
2. The response and request for hearing must be filed with:

Regional Hearing Clerk
U.S. EPA
77 W. Jackson Street, C-14J
Chicago, Illinois 60604
3. A copy of the response and request for hearing and copies of all subsequent documents filed in this action must be sent to:

Mr. Michael J. McClary
Office of Regional Counsel (C-14J)
U.S. EPA
77 W. Jackson Street
Chicago, Illinois 60604
4. The response must specify each factual or legal determination or relief provision in the Order that Respondent disputes and shall specify the basis upon which it disputes such determination or provision. The response should also include any proposals for modification of the Order.

5. Any hearings on the Order will be conducted in accordance with the attached hearing procedures.
6. If Respondent fails to file a response and request for hearing within 30 days after service of this Order, Respondent will be deemed to have waived its right to a hearing, and the Order will become final.

XXV. SETTLEMENT CONFERENCE

1. Whether or not Respondent requests a hearing, an informal conference may be requested at any time in order to discuss the facts of this case and to discuss potential settlement.
2. To request an informal conference Respondent must contact:

U.S. EPA Project Manager for Stewart-Warner Corp.
RCRA Enforcement and Compliance Assurance Branch
U.S. EPA Region 5
77 W. Jackson Street, DE-9J
Chicago, IL 60604
3. A request for an informal conference does not extend the 30 day period during which a written response and request for a hearing must be submitted. The informal conference procedure may be pursued simultaneously with the public hearing procedure.

XXVI. TERMINATION AND SATISFACTION

The provisions of this Order shall be deemed satisfied upon Respondent's receipt of written notice from U.S. EPA that Respondent has demonstrated, to the satisfaction of U.S. EPA, that the terms of this Order, including any additional tasks

determined by U.S. EPA to be required pursuant to this Order, or any continuing obligation or requirements, have been satisfactorily completed.

XXV. EFFECTIVE DATE

This Order shall become final 30 days after it is served, unless Respondent requests a public hearing pursuant to Section 3008(b) of RCRA, 42 U.S.C. § 6928(b).

IT IS SO ORDERED:

BY: *for*

Joseph M Boyle
Joseph M Boyle, Chief
RCRA Enforcement and Compliance
Assurance Branch
U.S. Environmental Protection Agency
Region 5

October 11, 2002
Date

RCRA-05- 2003 - 0001

US ENVIRONMENTAL PROTECTION AGENCY
REGION 5

02 OCT 15 P2:39

REGION 5
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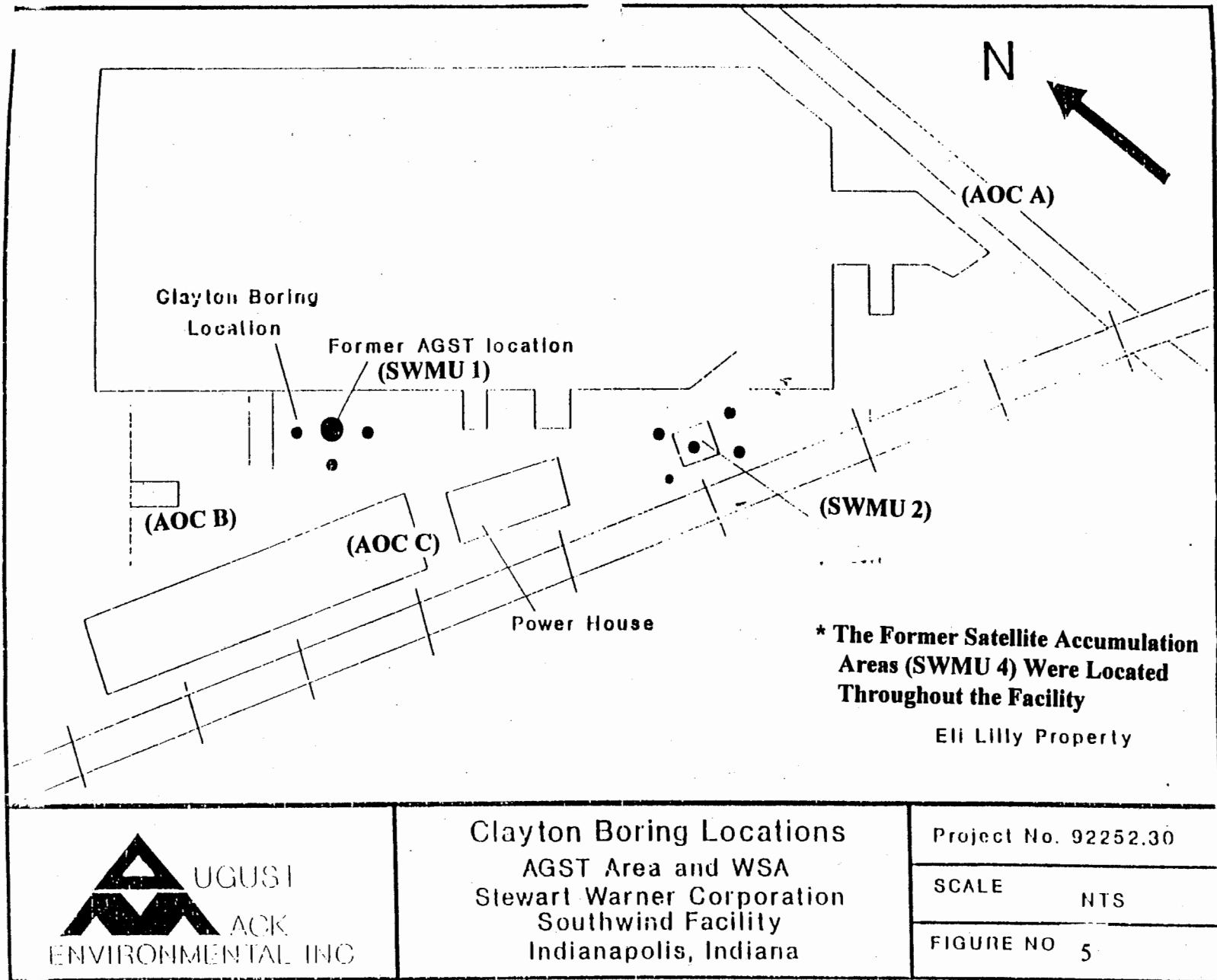


FIGURE 1.

ATTACHMENT I

Scope Of Work For Interim Measures

Purpose

IM are actions to control and/or eliminate releases hazardous wastes and/or hazardous constituents at or from the Facility prior to the implementation of final corrective measure(s). IM must be used whenever possible to achieve the goal of stabilization. Respondent shall furnish all personnel, materials and services necessary for, or incidental to, performing the IMs.

Scope

IM are one possible step in the corrective action program. IM consist of the following components, which for clarity have been designated as sections.

Section I: Interim Measure Tasks

- A. Task 1 - Contaminant Source Control/Removal
- B. Task 2 - Groundwater Plume Containment System
- C. Task 3 - Water Use Survey/Sampling

Section II: IM Workplan

- A. IM Objectives
- B. Health and Safety Plan
- C. Public Involvement Plan
- D. Quality Assurance Project Plan
- E. Data Management and Reporting Plan

Section III: IM Design Program

- A. Design Plans and Specifications
- B. Operations and Maintenance Plan
- C. Project Schedule
- D. Final Design Documents

Section IV: IM Construction Quality Assurance Plan

- A. Construction Quality Assurance Objectives
- B. Inspection Activities
- C. Documentation

Section V: Reports

- A. Progress
- B. IM Workplan
- C. Final Design Documents
- D. Draft IM Report
- E. Final IM Report

Section VI: Proposed Schedule

Section I: Interim Measure Tasks

IM are deemed necessary in order to control the documented releases of hazardous wastes and/or hazardous constituents at the Facility and to determine the water supplies and their quality in the vicinity of the Facility. Respondent shall perform the following three tasks:

A. Task 1 - Contaminant Source Control/Removal

Releases of hazardous wastes at the Facility to environmental media have been documented in Section V of the Order. Residual contamination in the area of past releases is an ongoing source of contaminants migrating to groundwater and surface water. Respondent shall prepare an IM Workplan to control and/or remove these contaminant sources.

The IM Workplan shall be submitted to U.S. EPA for review and approval within 30 days of the effective date of this Order. At a minimum, the IM Workplan shall meet the requirements of Section II, below, including the necessary criteria for determining the ongoing source areas that are contributing to groundwater and surface water contamination. The workplan shall include a schedule for field investigations, the proposed source control and/or removal actions, and the requisite implementation designs as required in Section III, below.

Respondent must ensure that the performance of the contaminant source control/removal task will be capable of meeting all applicable risk-based standards for the environmental media of concern, taking into consideration current and future use land scenarios. For groundwater and surface water, Respondent must demonstrate that the contaminant source control/removal task will result within a reasonable period of time, the attainment of applicable maximum contaminant levels (MCLs) for groundwater and applicable Indiana water quality standards for surface water at and in the vicinity of the Facility.

Respondent shall store, treat or dispose of contaminated soil and water generated during contaminant source control/removal in a manner that complies with the substantive standards of RCRA. Any discharge to navigable waters or disposal of contaminated water shall comply with all relevant local, State, and Federal requirements.

B. Task 2 - Groundwater Plume Containment System

U.S. EPA, Region 5, policy requires groundwater to meet MCLs as the target cleanup level unless cumulative risk or technical impracticability dictate otherwise. U.S. EPA's goal is to return useable ground waters to their maximum beneficial use within a reasonable time frame. In conjunction with Task 1, above, within 30 days of the effective date of this Order, Respondent shall submit an IM Workplan, including a task-specific Project Management Plan, Health and Safety Plan, Public Involvement Plan, Quality Assurance Project Plan, Data Management and Reporting Plan, Design Plan, Operation and Maintenance Plan, and Construction Quality Assurance Plan, consistent with Sections II, III, and IV, to U.S. EPA for approval. The workplan shall specify the design, installation, and operation of system(s) designed to attain proposed interim target cleanup levels, including the technical basis for such levels, for contaminants associated with the Facility in groundwater both on-site and off-site.

Based on the results of Task 1 field investigations and necessary groundwater sampling and characterization, Respondent shall propose the necessary designs and construction quality assurance program as required in Sections III and IV, below. Additional field investigations that may be necessary to complete this task shall be proposed concurrently in the Task 1, IM Workplan.

Respondent shall store, treat or dispose of any contaminated groundwater pumped or collected from the subsurface in a manner that complies with the substantive standards of RCRA, or shall arrange for off-site treatment, storage or disposal in compliance with RCRA. Any discharge to navigable waters or disposal of contaminated groundwater shall comply with all relevant local, State, and Federal requirements.

C. Task 3 - Water Use Survey/Sampling

Respondent shall prepare an IM Workplan capable of determining all users of groundwater within a one-mile radius of the Facility, or further, if deemed necessary by U.S. EPA. Based on historical data and hydrogeological information, including data and information generated pursuant to the IM Workplan for Tasks 1 and 2, above, Respondent shall propose and implement the water use survey/sampling program, as approved by U.S. EPA.

The IM Workplan for the water use survey/sampling program shall be submitted to U.S. EPA for review and approval within 30 days of the effective date of this Order. At a minimum, the IM

Workplan shall meet the requirements of Section II, below. The workplan shall include a schedule for field investigations and a target parameter list based on known and reasonably expected contaminants of concern associated with wastes managed at the Facility. The workplan shall also outline the actions necessary to address contamination found to be impacting or potentially impacting water users in the vicinity of the Facility.

The rationale for selecting wells from the survey to be sampled shall be based on, but not be limited to:

1. Well records from the Indiana Department of Natural Resources, the IDEM, the local County Combined Health District, and local well drillers;
2. Canvassing of private residences;
3. Aquifer usage;
4. Proximity to SWMUs and known releases;
5. Groundwater flow patterns determined in previous studies;
6. Potential influences from drawdown;
7. Number of individuals utilizing the well; and
8. Public usage (i.e., school, church, community, etc.).

In the event that permission can not be obtained to sample the selected water wells, Respondent shall demonstrate its best efforts in accordance with Section XI, of this Order.

Section II: Interim Measures Workplan

For the IM tasks required above and for additional IM proposed by Respondent and/or determined to be necessary by U.S. EPA, Respondent shall prepare an IM Workplan. The workplan shall include the development of several plans which shall be prepared concurrently.

A. Interim Measures Objectives

The workplan shall specify the objectives of the IM, demonstrate how the IM will abate releases and threatened releases, and to the extent possible, be consistent and integrated with any long-term solution at the Facility. The IM workplan will include a discussion of the technical approach, engineering design, engineering plans, schedules, budget, and personnel. The workplan will also include a description of qualifications of personnel performing or directing the IM, including contractor personnel. This plan shall also document the overall management approach to the IM and whether a Quality Assurance Project Plan and Data Management and Reporting Plan are required for the IM.

B. Health and Safety Plan

Respondent shall submit a Health and Safety Plan to U.S. EPA for review, although it does not require approval by U.S. EPA.

1. Major elements of the Health and Safety Plan may include:
 - Facility description, including availability of resources such as roads, water supplies, electricity and telephone services;
 - Description of the known hazards and evaluation of the risks associated with the incident and with each activity conducted;
 - A list of key personnel and alternates responsible for site safety, response operations, and for protection of human health;
 - Description of the levels of protection to be worn by personnel;
 - Delineation of the work area;
 - Procedures to control site access;
 - Description of decontamination procedures for personnel and equipment;
 - Site emergency procedures;
 - Emergency medical care for injuries and toxicological problems;
 - Description of requirements for an environmental surveillance program;
 - Routine and special training required for response personnel; and
 - Procedures for protecting workers from weather-related problems;
2. The Facility Health and Safety Plan shall be consistent with:
 - NIOSH Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (1985);
 - U.S. EPA Order 1440.1 - Respiratory Protection;
 - U.S. EPA Order 1440.3 - Health and Safety Requirements for Employees engaged in Field Activities;
 - Facility Contingency Plan;
 - U.S. EPA Standard Operating Safety Guide (1984);
 - OSHA regulations particularly in 29 C.F.R. 1910 and 1926;
 - State and local regulations; and
 - Other U.S. EPA guidance as provided.

C. Public Involvement Plan

All Public Involvement Plans prepared by Respondent shall be submitted to U.S. EPA for comment and approval prior to use. Respondents must never appear to represent or speak for U.S. EPA before the public, other government officials, or the media.

Public Involvement activities that may be required of Respondent include the following:

- Conducting an open house or informal meeting (i.e., availability session) in a public location where people can talk to Agency officials and Respondent on a one-to-one basis;
- Preparing fact sheets summarizing current or proposed corrective action activities (all fact sheets should be reviewed by U.S. EPA prior to public distribution);
- Communicating effectively with people who have vested interest in the corrective action activities, (e.g., providing written or verbal information in the foreign language of a predominantly non-English-speaking community); and
- Maintaining an easily accessible repository (such as a town hall or public library or the Facility itself, in some limited circumstances) of information on the Facility-specific corrective action program, including the order, approved workplans, and/or other reports.

A schedule for community relations activities shall be included in the Public Involvement Plan.

D. Quality Assurance Project Plan

Respondent shall prepare a plan to document all monitoring procedures, sampling, field measurements and sample analysis performed during IM so as to ensure that all information, data, and resulting decisions are technically sound, statistically valid, and properly documented. The QAPP shall be prepared in accordance with Attachment VI. If necessary, a pre-QAPP meeting will be held prior to preparation of the QAPP. Participants should include Respondent, their QAPP preparer, laboratory representatives, U.S. EPA Project Coordinator, and U.S. EPA Quality Assurance representatives.

A performance audit may be conducted by U.S. EPA on the laboratory selected by Respondent.

E. Data Management and Reporting Plan

Respondent shall develop and initiate a Data Management and Reporting Plan to document and track IM data and results. This plan shall identify and set up data documentation materials and procedures, project file requirements, and project-related progress reporting procedures and documents. The plan shall also provide the format to be used to present the raw data and conclusions of the IM.

All groundwater data shall be submitted in a computer accessible format, i.e., diskette. The format used shall be compatible with U.S. EPA, Region 5 groundwater database known as the Ground Water Information Tracking System (GRITS), Version 4.0.

Section III: Interim Measures Design Program

A. Design Plans and Specifications

Respondent shall develop clear and comprehensive design plans and specifications which include but are not limited to the following:

1. Discussion of the design strategy and the design basis, including:
 - Compliance with all applicable or relevant environmental and public health standards; and
 - Minimization of environmental and public impacts.
2. Discussion of the technical factors of importance including:
 - Use of currently accepted environmental control measures and technology;
 - The constructibility of the design; and
 - Use of currently acceptable construction practices and techniques.
3. Description of assumptions made and detailed justification of these assumptions.
4. Discussion of the possible sources of error and references to possible operation and maintenance problems.
5. Detailed drawings of the proposed design including:
 - Qualitative flow sheets;
 - Quantitative flow sheets;
 - System layout; and
 - Utility locations.
6. Tables listing materials, equipment and specifications.
7. Tables giving material balances.
8. Appendices including:

- Sample calculations (one example presented and explained clearly for significant or unique design calculations);
- Derivation of equations essential to understanding the report; and
- Results of laboratory or field tests.

General correlations between drawings and technical specifications is a basic requirement of any set of working construction plans and specifications. Before submitting the project specifications, Respondent shall coordinate and cross-check the specifications and drawings and complete the proofing of the edited specifications and required cross-checking of all drawings and specifications.

B. Operation and Maintenance Plan

Respondent shall prepare an Operation and Maintenance Plan to cover both implementation and long-term maintenance of the IM. The plan shall be composed of the following elements as appropriate to the specific IM:

1. Equipment start-up and operator training
Respondent shall prepare, and include in the technical specifications governing treatment systems, contractor requirements for providing appropriate service visits by experienced personnel to supervise the installation, adjustment, start-up and operation of the treatment systems and training covering appropriate operational procedures once the start-up has been successfully accomplished.
2. Description of normal operation and maintenance (O&M), including:
 - Description of tasks for operation;
 - Description of tasks for maintenance;
 - Description of prescribed treatment or operation conditions;
 - Schedule showing frequency of each O&M task; and
 - Common and/or anticipated remedies.
3. Description of routine monitoring and laboratory testing, including:
 - Description of monitoring tasks;
 - Description of required laboratory tests and their interpretation;
 - Required QA/QC; and
 - Schedule of monitoring frequency and date, if appropriate, when monitoring may cease.
4. Description of equipment, including:
 - Equipment identification;

- Installation of monitoring components;
 - Maintenance of site equipment; and
 - Replacement schedule for equipment and installed components.
5. Records and reporting mechanisms required, including:
- Operating logs;
 - Laboratory records;
 - Mechanism for reporting emergencies;
 - Personnel and maintenance records; and
 - Monthly/annual reports, as appropriate, to Federal/State agencies.

The Operation and Maintenance Plan shall be submitted with the Final Design Documents or as approved in the IM Workplan.

C. Project Schedule

Respondent shall develop a detailed Project Schedule for construction and implementation of the IM(s) which identifies timing for initiation and completion of all critical path tasks. Respondent shall specifically identify dates for completion of the project and major interim milestones which are enforceable terms of this Order. A Project Schedule shall be submitted simultaneously with the Final Design Documents.

D. Final Design Documents

The Final Design Documents shall consist of the Final Design Plans and Specification, the final Draft Operation and Maintenance Plan, and Project Schedule. Respondent shall submit the final documents 100% complete with reproducible drawings and specifications. The quality of the design documents should be such that Respondent would be able to include them in a bid package and invite contractors to submit bids for the construction project.

Section IV: Interim Measure Construction Quality Assurance Plan

A. Construction Quality Assurance Objectives

In the CQA plan, Respondent shall identify and document the objectives and framework for the development of a construction quality assurance program including, but not limited to the following: responsibility and authority; personnel qualifications; inspection activities; sampling requirements; and documentation. The responsibility and authority of all organizations (i.e., technical consultants, construction firms, etc.) and key personnel involved in the construction of the IM

should be described fully in the CQA plan. Respondent must identify a CQA officer and the necessary supporting inspection staff.

B. Inspection Activities

The observations and tests that will be used to monitor the construction and/or installation of the components of the IM(s) shall be summarized in the CQA plan. The plan shall include the scope and frequency of each type of inspection. Inspections shall verify compliance with all environmental requirements and include, but not be limited to air quality and emissions monitoring records, waste disposal records (e.g., RCRA transportation manifests), etc. The inspection should also ensure compliance with all health and safety procedures. In addition to oversight inspections, Respondent shall conduct the following activities:

1. Preconstruction inspection and meeting

Respondent shall conduct a preconstruction inspection and meeting to:

- Review methods for documenting and reporting inspection data;
- Review methods for distributing and storing documents and reports;
- Review work area security and protocol;
- Discuss any appropriate modifications of the construction quality assurance plan to ensure that site-specific considerations are addressed; and
- Conduct a site walk-around to verify that the design criteria, plans, and specifications are understood and to review material and equipment storage locations.

The preconstruction inspection and meeting shall be documented by a designated person and minutes should be transmitted to all parties.

2. Prefinal inspection

Upon preliminary project completion, Respondent shall notify U.S. EPA for the purposes of conducting a prefinal inspection. The prefinal inspection will consist of a walk-through inspection of the entire project site. The inspection is to determine whether the project is complete and consistent with the contract documents and the U.S. EPA approved IM. Any outstanding construction items discovered during the inspection will be identified and noted. Additionally, treatment equipment will be operationally tested by Respondent will certify that the equipment has performed to meet the purpose and intent of the

specifications. Retesting will be completed where deficiencies are revealed. The prefinal inspection report should outline the outstanding construction items, actions required to resolve items, completion date for these items, and date for final inspection.

3. Final Inspection

Upon completion of any outstanding construction items, Respondent shall notify U.S. EPA for the purpose of conducting a final inspection. The final inspection will consist of a walk-through inspection of the project site. The prefinal inspection will be used as a checklist with the final inspection focusing on the outstanding items that have been resolved.

4. Sampling and Testing Requirements

The sampling and testing activities, sample size, sample and test locations, frequency of testing, acceptance and rejection criteria, and plans for correcting problems should be presented in the CQA.

C. Documentation

Reporting requirements for CQA activities shall be described in detail the CQA plan. This shall include such items as daily summary reports, inspection data sheets, problem identification and IM reports, design acceptance reports and final documentation. Provisions for the final storage of all records shall be presented in the CQA plan.

Section V: Reports

A. Progress

Respondent shall at a minimum provide U.S. EPA with signed, monthly progress reports containing:

1. A description and estimate of the percentage of the IM completed;
2. Summaries of all findings;
3. Summaries of all changes made in the IM during the reporting period;
4. Summaries of all contacts with representatives of the local community, public interest groups, or State government during the reporting period;
5. Summaries of all problems or potential problems encountered during the reporting period;
6. Actions being taken to rectify problems;
7. Changes in personnel during the reporting period;
8. Projected work for the next reporting period; and

9. Copies of daily reports, inspection reports, laboratory/monitoring data, etc.

B. Interim Measures Workplan

Respondent shall submit an IM Workplan as described in Sections I, II, III, and IV.

C. Final Design Documents

Respondent shall submit the Final Design Documents as described in Section III.

D. Draft Interim Measures Report

At the completion of the IM construction (except for long-term operations, maintenance and monitoring), Respondent shall submit an IM and Implementation Report to U.S. EPA. This Report shall document that the project is consistent with the design specifications, and that the IM are performing adequately. The Report shall include, but not be limited to, the following elements:

1. Synopsis of the IM and certification of the design and construction;
2. Explanation of any modifications to the plan and why these were necessary for the project;
3. Listing of criteria, established before the IM were initiated, for judging the functioning of the IM and also explaining any modification to these criteria;
4. Results of IM system monitoring, indicating that IM will meet or exceed the performance criteria; and
5. Explanation of the operation and maintenance (including monitoring) to be undertaken at the Facility.

This report shall include the inspection summary reports, inspection data sheets, problem identification and corrective measure reports, block evaluation reports, photographic reporting data sheets, design engineers' acceptance reports, deviations from design and material specifications (with justifying documentation) and as-built drawings.

E. Final Interim Measures Report

Respondent shall finalize the IM Work Plan and the IM Implementation Report incorporating comments received on draft submissions.

Section VI: Proposed Schedule

Respondent will provide U.S. EPA with IM submittals according to the following schedule:

Facility Submission	Due Date
IM Workplan -IM Objectives -Health and Safety Plan -Public Involvement Plan -Quality Assurance Project Plan -Data Management and Reporting Plan -Construction QA Plan	Within 30 days of the effective date of this Order for Tasks I, II, and III or within 30 days of U.S. EPA's request/determination or upon written request
Final Design Documents -Design Plans and Specs -O&M Plan -Project Schedule	As outlined in the approved IM workplan
Draft IM Report	In accordance with the project schedule approved in the IM Workplan
Final IM Report	45 days after receipt of U.S. EPA comments on Draft IM Report
Progress Reports	Monthly

ATTACHMENT II

Scope of Work for a RCRA Facility Investigation

Purpose

The purpose of the RFI is to determine the nature and extent of releases of hazardous waste or constituents from regulated units, SWMUs, AOCs, and other source areas at and from the Facility and to gather all necessary data to support a CMS. Respondent shall furnish all personnel, materials, and services necessary for, or incidental to, performing the RFI.

Scope

The RFI is one step in the corrective action program. The RFI consists of the following components, which for clarity have been designated as sections.

Section I: Description of Current Conditions (DOCC)

- A. Facility Background
- B. Preliminary Assessment of Nature and Extent of Contamination
- C. Implementation of Interim/Stabilization Measures

Section II: RFI Workplan

- A. Purpose/Objectives
- B. Project Management Plan
- C. Quality Assurance Project Plan
- D. Data Management and Reporting Plan
- E. Health and Safety Plan
- F. Public Involvement Plan
- G. Schedule for Facility Investigation

Section III: Facility Investigation

- A. Purpose/Objectives
- B. Environmental Setting
- C. Source Characterization
- D. Contamination Characterization
- E. Potential Receptor Identification

Section IV: Investigation Results and Analysis

- A. Data Analysis
- B. Analysis of Risk
- C. Media Cleanup Standards

Section V: Progress Reports

Section VI: Proposed Schedule

Section I: Description of Current Conditions

Respondent shall submit to U.S. EPA for review and comment, a report (as set forth below) providing the background information on the Facility, contamination, and IM. Respondent shall indicate in the applicable section if some of this information is not available. This report shall contain information that is consistent with the data gathered during the RFA. The current condition report shall be submitted concurrently with the submission of the IM Workplan.

A. Facility Background

Respondent's report shall summarize the regional location, pertinent boundary features, general Facility physiography, hydro geology, and historical use of the Facility for the treatment, storage, or disposal of solid and hazardous waste. Respondent's report shall include:

1. *Maps.* All maps shall be of sufficient detail and accuracy to locate and report all current and future work performed at the site. Aerial photographs may be used with SWMUs, AOCs, and other source areas superimposed on them. (Note: An aerial photographic analysis of the Facility from 1946 through 1996 has been performed by U.S. EPA and will be used to provide additional background information on the Facility, including waste-related features and potential sources of contamination.) Maps shall depict the following:
 - General geographic location;
 - Property lines, with the owners of all adjacent property clearly indicated;
 - Topography and surface drainage depicting all waterways, wetlands, flood plains, water features, drainage patterns, and surface-water containment areas;
 - All tanks, buildings, utilities, paved areas, easements, rights-of-way, and other features;
 - All solid or hazardous waste treatment, storage, or disposal areas active after November 19, 1980;
 - All known past solid or hazardous waste treatment, storage or disposal areas regardless of whether they were active on or after November 19, 1980;
 - All known past and present product and waste underground tanks or piping;
 - Surrounding land uses (residential, commercial, industrial, agricultural, recreational);
 - The location of all municipal, public, private and industrial wells, along with all monitoring wells,

at the Facility and within a 1-mile radius of the Facility. These wells shall be clearly labeled and ground and top of casing elevations and construction details included, if available (these elevations and details may be included as an attachment); and

- Wind rose and meteorology.
- 2. A history and description of ownership and operation, solid and hazardous waste generation, treatment, storage and disposal activities at the Facility.
- 3. Approximate dates or periods of past product and waste spills, identification of the materials spilled, the amount spilled, the location where spilled, and a description of the response actions conducted (local, State, or Federal response units or private parties), including any inspection reports or technical reports generated as a result of the response.
- 4. A summary of past permits applied for and/or received, any enforcement actions and their subsequent responses and a list of documents and studies prepared for the Facility. This may include information from previous and/or present owner/operators, if available.
- 5. A general description of major habitat types (e.g., grasslands, forests, lakes, streams, wetlands) located in and adjacent to the Facility. In delineating wetlands, the U.S. Fish and Wildlife Service's National Wetland Inventory maps should be consulted. The U.S. Army Corps of Engineers should be consulted and wetlands should be delineated using the Federal Manual for Identifying and Delineating Jurisdictional Wetlands.
- 6. A general description of plants and animals at and adjacent to the Facility, including the following: qualitative observations of resident plants and animals (birds, mammals, fish, stream benthos, etc.); and classification of vegetation community types. Threatened and endangered species possibly on or near the Facility should be identified as early as possible.

B. Preliminary Assessment of Nature and Extent of Contamination

Respondent shall prepare and submit for U.S. EPA review, a preliminary report describing the existing information on the nature and extent of contamination.

1. Respondent's report shall summarize all possible source areas of contamination. This, at a minimum, shall include all RCRA-regulated units, SWMUs, AOCs, spill areas, and other suspected source areas of

contamination. For each area, Respondent shall identify the following:

- Location of unit/area (to be depicted on facility map provided in Section I.A.1);
 - Quantities of solid and hazardous wastes (both managed and spilled or released), if available;
 - Type of hazardous waste or constituents (both causing or potentially causing contamination), to the extent known;
 - Identification of areas where additional information is necessary; and
 - The results of previous investigations.
2. Respondent shall prepare a preliminary assessment and description of the existing degree and extent of contamination. This shall include:
- For each medium where the Order identifies a release (e.g., soil, groundwater, surface water, sediments, etc.), a description of the existing extent of contamination. This description must include all available monitoring data and qualitative information on the locations and levels of contamination at the Facility (both on-site and off-site). Include biodata (e.g., fish kills, distressed vegetation, abnormal individuals of a species, carcasses, tissue studies, etc.). Include a general assessment of the data quality, a map showing the location of all existing sampling points and potential source areas and contour maps showing any existing ground water plumes at the Facility. Highlight potential ongoing release areas that would warrant use of IM (see Section I.C. Implementation of Interim/Stabilization Measures); and
 - A list and brief description of all previous investigations that have occurred at the Facility, who they were conducted for (i.e., agency) and agency contacts.
3. Respondent shall submit a report that identifies the potential impact(s) on human health and the environment, including potential exposure pathways, migration routes, and potential receptors for all relevant land use scenarios related to the sources of contamination identified as relevant in paragraph 1, above. A preliminary site-conceptual model should be created to illustrate these pathways, routes, and receptors. The report shall include, at a minimum:
- All potential migration pathways, including information on geology, pedology, hydro geology,

- physiography, hydrology, water quality, foodwebs, meteorology, air quality, chemistry, fate and transport characteristics associated with affected media, and natural attenuation, as appropriate;
- Physical properties of known contaminants;
 - An assessment of whether off-site migration of contaminants has occurred or is likely to occur;
 - An assessment of media-specific potential human exposure pathways (e.g., ingestion, inhalation, dermal contact), including groundwater and surface water use;
 - Identification of current and future land use;
 - Identification of current or potential receptors at risk including demography and identification of possible sensitive subpopulations (e.g., schools, homes for the elderly, hospitals, and ecosystems).

C. Implementation of Interim/Stabilization Measures

Respondent's report shall document past, present, or proposed interim/stabilization measures at the Facility. This shall include:

- Objectives of the interim/stabilization measures: how the measure is mitigating a potential threat to human health and the environment and/or is consistent with and integrated into any long-term solution at the Facility;
- Design, construction, operation, and maintenance requirements;
- Schedules for design, construction and monitoring;
- Schedule for progress reports; and
- Data in support of the potential need for future IM or related to any assessment undertaken to determine the need for future interim/stabilization measures.

Section II: RFI Workplan

A. Purpose/Objectives

Respondent shall prepare an RFI Workplan. The purpose of the RFI Workplan is to present to U.S. EPA the specific plans to characterize the nature and extent of contamination. The RFI Workplan shall include the development of several plans, which will be prepared concurrently. During the RFI, it may be necessary to revise the RFI Workplan to increase or decrease the detail of information collected to accommodate Facility-specific situations.

B. Project Management Plan

Respondent shall prepare a Project Management Plan (PMP) which will include a discussion of the technical approach, schedules, and personnel. The PMP will also include a description of qualifications of personnel performing or directing the RFI, including contractor personnel. This plan shall also document the overall management approach to the RFI.

C. Quality Assurance Project Plan

Respondent shall prepare a plan to document all monitoring procedures, sampling, field measurements and sample analysis performed during the investigations so as to ensure that all information, data, and resulting decisions are technically sound, statistically valid, and properly documented. The QAPP shall be prepared in accordance with Attachment VI. A pre-QAPP meeting shall be held prior to preparation of the QAPP. Participants shall include, but are not limited to Respondent, their QAPP preparer, laboratory representatives, the U.S. EPA Project Coordinator, and U.S. EPA Quality Assurance representatives.

A performance audit may be conducted by U.S. EPA on the laboratories selected by Respondent. This audit will be completed and laboratories approved for use on the project prior to the start of field work for the RFI.

D. Data Management and Reporting Plan

Respondent shall develop and initiate a Data Management and Reporting Plan to document and track investigation data and results. This plan shall identify and set up data documentation materials and procedures, project file requirements, and project-related progress reporting procedures and documents. The plan shall also provide the format to be used to present the raw data and conclusions of the IM.

All groundwater data shall be submitted in a computer accessible format, i.e., diskette. The format used shall be compatible with U.S. EPA, Region 5 groundwater database known as the Ground Water Information Tracking System (GRITS), Version 4.0.

E. Health and Safety Plan

Respondent shall submit a Health and Safety Plan to U.S. EPA for review, although it does not require approval by U.S. EPA.

1. Major elements of the Health and Safety Plan may include:

- Facility description, including availability of resources such as roads, water supplies, electricity and telephone services;
 - Description of the known hazards and evaluation of the risks associated with the incident and with each activity conducted;
 - A list of key personnel and alternates responsible for site safety, response operations, and for protection of human health;
 - Description of the levels of protection to be worn by personnel;
 - Delineation of the work area;
 - Procedures to control site access;
 - Description of decontamination procedures for personnel and equipment;
 - Site emergency procedures;
 - Emergency medical care for injuries and toxicological problems;
 - Description of requirements for an environmental surveillance program;
 - Routine and special training required for response personnel; and
 - Procedures for protecting workers from weather-related problems.
2. The Facility Health and Safety Plan shall be consistent with:
- NIOSH Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (1985);
 - U.S. EPA Order 1440.1 - Respiratory Protection;
 - U.S. EPA Order 1440.3 - Health and Safety Requirements for Employees engaged in Field Activities;
 - Facility Contingency Plan;
 - U.S. EPA Standard Operating Safety Guide (1984);
 - OSHA regulations particularly in 29 C.F.R. 1910 and 1926;
 - State and local regulations; and
 - Other U.S. EPA guidance as provided.

F. Public Involvement Plan

The Public Involvement Plan (PIP) prepared by Respondent shall be submitted to U.S. EPA for comment and approval prior to use. Respondents must never appear to represent or speak for U.S. EPA before the public, other government officials, or the media.

Public involvement activities that may be required of Respondent include the following:

- Conducting an open house or informal meeting (i.e., availability session) in a public location where people can talk to Agency officials and Respondent on a one-to-one basis;
- Preparing fact sheets summarizing current or proposed corrective action activities (all fact sheets should be reviewed by U.S. EPA prior to public distribution);
- Communicating effectively with people who have vested interest in the corrective action activities, (e.g., providing written or verbal information in the foreign language of a predominantly non-English-speaking community); and
- Maintaining an easily accessible repository (such as a town hall or public library or the Facility itself, in some limited circumstances) of information on the Facility-specific corrective action program, including the order, approved workplans, and/or other reports.

A schedule for community relations activities shall be included in the PIP.

G. Schedule for Facility Investigation

1. Sampling
2. Analysis
3. Reports
4. Public Involvement Activities
5. Laboratory or Bench-Scale Studies

Section III: Facility Investigation

A. Purpose/Objectives

The Facility Investigation phase of the RFI is the first step of the implementation process. Prior to this implementation phase, all documentation and reports for the Description of Current Conditions and RFI Workplan are drafted and submitted to U.S. EPA for review. Respondent must have approval prior to implementing the procedures outlined in the RFI Workplan. Throughout the RFI implementation phase, it is critical that Respondent comply with report submission requirements. Respondent shall submit both progress reports and a draft RFI Report to U.S. EPA for review. Respondent shall develop in final format the RFI Report, which will incorporate any applicable comments, including conditions and/or modifications, received on the draft report.

To the extent necessary to protect human health and the environment, Respondent shall conduct those additional investigations (including sampling) as approved in the RFI

Workplan to: characterize the Facility (Environmental Setting); define the source (Source Characterization); define the degree and three dimensional extent of contamination (Contamination Characterization); and identify actual or potential receptors (Potential Receptors Identification).

The investigations shall result in data of adequate technical quality to support the development and evaluation of the corrective measure alternative(s) during the CMS and/or IMs.

B. Environmental Setting

Respondent shall collect information to supplement and verify existing information on the environmental setting at the Facility (when information already submitted to U.S. EPA is not sufficient). U.S. EPA may request additional information not included on the following lists. Respondent shall characterize the following areas:

1. Hydro geology

Respondent shall conduct a program to evaluate hydro geologic conditions at the Facility. This program shall provide the following information:

- A description of the regional and Facility-specific geologic and hydro geologic characteristics affecting groundwater flow beneath the Facility, including:
 - Regional and Facility-specific stratigraphy including: description of strata including strike and dip, and identification of stratigraphic contacts;
 - Structural geology including: description of local and regional structural features (e.g., folding, faulting, tilting, jointing, etc.);
 - Depositional history;
 - Areas and amounts of recharge and discharge;
 - Influence of tidal actions on groundwater flow regimes near large rivers;
 - Regional and facility-specific groundwater flow patterns; and
 - Seasonal variations in the groundwater flow regime.
- An analysis of topographic features that might influence the groundwater flow system. (Note: Stereographic analysis of aerial photographs may aid in this analysis.)
- A representative and accurate classification and description of the hydro geologic units based on field data, tests, and cores that may be part of

the migration pathways at the Facility (i.e., the aquifers and any intervening saturated and unsaturated zones), including, but not limited to:

- Hydraulic conductivity, intrinsic permeability [particularly when non-aqueous phase liquids (NAPLs) are present], and porosity (total and effective);
 - Lithology, grain size, sorting, degree of cementation;
 - An interpretation of hydraulic interconnections between saturated zones; and
 - The attenuation capacity and mechanisms of the natural earth materials (e.g., ion exchange capacity, organic carbon content, mineral content, etc.).
- Based on field studies and cores, structural geology and hydro geologic cross sections showing the extent (depth, thickness, lateral extent) of hydro geologic units that may be part of the migration pathways identifying:
 - Sand and gravel in unconsolidated deposits;
 - Zones of fracturing or channeling in consolidated and unconsolidated deposits;
 - Zones of higher permeability or low permeability that might direct and restrict the flow of contaminants;
 - The uppermost aquifer: geologic formation, group of formations, or part of a formation capable of yielding a significant amount of groundwater to wells or springs;
 - Water-bearing zones above the first confining layer that may serve as a pathway for contaminant migration, including perched zones of saturation; and
 - All other geologic formations, or parts thereof, yielding a significant amount of groundwater.
 - Based on data obtained from groundwater monitoring wells and piezometers installed upgradient and downgradient of the potential contaminant source, a representative description of water level or fluid pressure monitoring including:
 - Water level contour and/or potentiometric maps;
 - Hydrologic cross sections showing vertical flow gradients;
 - The flow system, including the vertical and horizontal components of flow; and

- Any temporal changes in hydraulic gradients, (due to tidal or seasonal influences, etc.)
- A description of man-made influences that may affect the hydro geology of the site, identifying:
 - Active and inactive local water-supply and production wells with an approximate schedule of pumping; and
 - Man-made hydraulic structures (sewers, pipelines, french drains, ditches, unlined ponds, septic tanks, NPDES outfalls, retention areas, etc.).

2. Soils

Respondent shall conduct a program to characterize the soil and rock units potentially affected by contaminant release(s). Such characterization shall include, but not be limited to, the following information:

- Where remediation by removal of soils is the only corrective measure option, provide map(s) and perpendicular cross sections showing:
 - The extent of contamination as necessary to support a baseline risk assessment for determining if a CMS is needed or for supporting the selection of corrective measures during the CMS;
 - Depth of groundwater; and
 - The consistency and distribution of soils [using the Unified Soil Classification System (ASTM D 2487)];
- Where remediation by removal is the likely option, and it is necessary to determine the extent of migration (e.g., to assess the mobility of wastes from an unlined surface impoundment or landfill), provide the following in addition to the requirements immediately above:
 - Depth to bedrock and the characteristics of the bedrock including discontinuities such as faults, fissures, joints, fractures, sinkholes, etc.;
 - A detailed soil survey conducted according to USDA Soil Conservation Service (SCS) procedures including:
 - USDA Textural Soil Classification and soil profiles showing stratifications or zones which may affect or direct the subsurface flow;
 - Hydraulic conductivity and the SCS hydrologic group classification of A, B, C or D;

- Relative permeability (only if the waste may have changed the soil's hydraulic conductivity, such as concentrated organics);
- Storage capacity (if excavated soil will be stored);
- Shrink-swell potential (where extreme dry weather could lead to the formation of cracks);
- Potential for contaminant transport via erosion, using the Universal Soil Loss Equation;
- Soil sorptive capacity;
- Cation exchange capacity;
- Soil organic content; and
- Soil pH.
- The following contaminant characteristics must be included:
 - Physical state;
 - Viscosity;
 - pH;
 - pKa;
 - Density;
 - Water solubility;
 - Henry's Law Constant;
 - K_{ow} ;
 - Biodegradability; and
 - Rates of hydrolysis, photolysis and oxidation.
- Where in-situ soil treatment will likely be the remediation, the above information and the following additional information must be provided:
 - Bulk density;
 - Porosity;
 - Grain size distribution;
 - Mineral content;
 - Soil moisture profile;
 - Unsaturated hydraulic conductivity;
 - Effect of stratification on unsaturated flow; and
 - Infiltration and evapotranspiration.

3. Surface Water and Sediment

Respondent shall conduct a program to characterize the surface water bodies that are likely to be affected by releases from the Facility (e.g., White River) Such characterization shall include the following activities and information:

- Description of the temporal and permanent surface water bodies including:
 - For lakes: location, elevation, surface area, inflow, outflow, depth, temperature stratification, and volume;
 - For impoundments: location, elevation, surface area, depth, volume, freeboard, and purpose of impoundment;
 - For rivers, streams, ditches, drains, swamps and channels: location, elevation, flow, velocity, depth, width, seasonal fluctuations, and flooding tendencies (i.e., 100-year event);
 - For wetlands obtain any available delineation;
 - Containment measures in place (e.g., levees, concrete lining, etc.)
 - Drainage patterns; and
 - Evapotranspiration rates.
- Description of the chemistry of the natural surface water and sediments. This includes determining:
 - pH;
 - total dissolved solids;
 - total suspended solids;
 - biological oxygen demand;
 - alkalinity;
 - conductivity;
 - dissolved oxygen profiles;
 - nutrients (NH_3 , $\text{NO}_3^-/\text{NO}_2^-$, PO_4^{3-});
 - chemical oxygen demand;
 - total organic carbon; and
 - concentrations of the site-specific contaminants of concern.
- Description of sediment characteristics including:
 - Deposition area;
 - Thickness profile; and
 - Physical parameters (e.g., grain size, density, ion exchange capacity, etc.).

4. Air

Respondent shall provide information characterizing the climate in the vicinity of the Facility. Such information shall include:

- A description of the following parameters:
 - Annual and monthly rainfall averages;
 - Monthly temperature averages and extremes;
 - Wind speed and direction;
 - Relative humidity/dew point;
 - Atmospheric pressure;
 - Evaporation data;
 - Development of inversions; and

- Climate extremes that have been known to occur in the vicinity of the Facility, including frequency of occurrence.
- A description of topographic and man-made features that affect air flow and emission patterns, including:
 - Ridges, hills, or mountain areas;
 - Canyons or valleys;
 - Surface water bodies (e.g., rivers, lakes, etc.);
 - Wind breaks and forests; and
 - Buildings.

C. Source Characterization

Respondent shall collect analytical data to characterize the wastes and the areas where wastes have been placed, collected or removed including: type; quantity; physical form; disposition (containment or nature of disposal); and any facility characteristics that may affect or have affected a release (e.g., facility security, engineered barriers). This shall include quantification of the following specific characteristics, at each source area:

1. Unit/Disposal Area/AOC Characteristics:
 - Location of unit/disposal area;
 - Type of unit/disposal area;
 - Design features;
 - Operating practices (past and present) including the history of releases;
 - Period of operation;
 - Age of unit/disposal area;
 - General physical conditions; and
 - Method used to close or remediate the unit/disposal area.
2. Waste Characteristics:
 - Type of waste placed in the unit;
 - Hazardous classification (e.g., flammable, reactive, corrosive, oxidizing or reducing agent);
 - Quantity; and
 - Chemical composition.
 - Physical and chemical characteristics;
 - Physical form (solid, liquid, gas);
 - Physical description (e.g., powder, oily sludge);
 - Temperature;
 - pH;

- General chemical class (e.g., acid, base, solvent);
- Molecular weight;
- Density;
- Boiling point;
- Viscosity;
- Solubility in water;
- Cohesiveness of the waste;
- Vapor pressure; and
- Flash point.
- Migration and dispersal characteristics of the waste;
 - Sorption;
 - Biodegradability, bioconcentration, biotransformation;
 - Photodegradation rates;
 - Hydrolysis rates; and
 - Expected chemical transformations.

Respondent shall document the procedures used in making the above determinations.

D. Contamination Characterization

Respondent shall collect analytical data on environmental media, including ground water, soils, surface water, sediment, and air likely to be affected by releases from the Facility. This data shall be sufficient to define the extent, origin, direction, and rate of movement of contaminant plumes to the extent necessary to assess the impact to human health and the environment. Data shall include:

- time and location of sampling;
- media sampled;
- concentrations found;
- conditions during sampling; and
- the identity of the individuals performing the sampling and analysis.

Respondent shall address the following types of contamination at the Facility:

1. Groundwater Contamination

Respondent shall conduct a groundwater investigation to characterize any plumes of contamination at the Facility. This investigation shall, provide the following information:

- A description of the horizontal and vertical extent of any immiscible or dissolved plume(s) originating from the Facility;
 - The horizontal and vertical direction of contaminant movement;
 - The velocity of contaminant movement;
 - The horizontal and vertical concentration profiles of constituents of concern (approved by U.S. EPA as derived from Appendix IX) constituents in the plume(s);
 - An evaluation of factors influencing the plume movement; and
 - An extrapolation of future contaminant movement.
- Respondent shall document the procedures used in making the above determinations (e.g., well design, well construction, geophysics, modeling, etc.).

2. Soil Contamination

Respondent shall conduct an investigation to characterize the contamination of the soil and rock units above the water table in the vicinity of the contaminant release. The investigation shall include the following information:

- A description of the vertical and horizontal extent of contamination;
- A description of contaminant and soil chemical properties within the contaminant source area and plume. This includes contaminant solubility, speciation, adsorption, leachability, exchange capacity, biodegradability, hydrolysis, photolysis, oxidation and other factors that might affect contaminant migration and transformation;
- Site-specific contaminant concentrations;
- Velocity and direction of contaminant movement; and
- An extrapolation of future contaminant movement.

Respondent shall document the procedures used in making the above determinations.

3. Surface Water and Sediment Contamination

Respondent shall conduct a surface water and sediment investigation to characterize contamination in surface water bodies resulting from contaminant releases at the Facility. Respondent is also required to characterize contamination from storm water runoff. The investigation shall include the following information:

- A description of the horizontal and vertical extent of any immiscible or dissolved plume(s)

originating from the Facility, and the extent of contamination in underlying sediments;

- The horizontal and vertical direction of contaminant movement;
- The contaminant velocity;
- An evaluation of the physical, biological, and chemical factors influencing contaminant movement;
- An extrapolation of future contaminant movement; and
- A description of the chemical and physical properties of the contaminated surface waters and sediments. This includes determining the pH, total dissolved solids, specific contaminant concentrations, etc.

Respondent shall document the procedures used in making the above determinations.

4. Air Contamination

Respondent shall conduct an investigation to characterize the particulate and gaseous contaminants released into the atmosphere that are not subject to an effective Federal or State permit. This investigation shall provide the following information:

- A description of the horizontal and vertical direction and velocity of contaminant movement;
- The rate and amount of the release; and
- The chemical and physical composition of the contaminants(s) released, including horizontal and vertical concentration profiles.

Respondent shall document the procedures used in making the above determinations.

E. Potential Receptor Identification

Respondent shall collect data describing the human populations and environmental systems that currently or potentially are at risk of contaminant exposure from the Facility. Chemical analysis of biological samples may be needed. Data on observable effects in ecosystems may also be required by U.S. EPA. The following characteristics shall be identified:

1. Local uses and possible future uses of groundwater:

- Type of use (e.g., drinking water source: municipal or residential, agricultural, domestic/non-potable, public and industrial) and
- Location of groundwater users including wells and discharge areas.

2. Local uses and possible future uses of surface waters characterized in the "Environmental Setting" or "Contamination Characterization" Sections above:
 - Domestic and municipal (e.g., potable and lawn/gardening watering);
 - Recreational (e.g., swimming, fishing);
 - Agricultural;
 - Industrial; and
 - Environmental (e.g., fish and wildlife propagation).
3. Authorized or unauthorized human use of or access to the Facility and adjacent lands, including but not limited to:
 - Recreation;
 - Hunting;
 - Residential;
 - Commercial;
 - Zoning; and
 - Relationship between population locations and prevailing wind direction.
4. A demographic profile of the people who use or have access (authorized or unauthorized) to the Facility and adjacent land, including, but not limited to: age; sex; sensitive subgroups; and environmental justice concerns.
5. A description of the ecological characteristics of the Facility and adjacent areas, including habitat and species present and expected to be present. Data required for this may include the following:
 - Chemical sampling in potentially exposed habitats and reference sites.
 - Toxicity testing.
 - Tissue analyses.
 - Biological community assessment.
 - Habitat assessment of aquatic and terrestrial habitats on or potentially affected by the Facility.
 - Revised assessment of ecological impacts on receptors. Impacts should include those occurring at individual level (e.g., mortality, growth and reproductive impairments) and those occurring at higher levels of biological organization (i.e., at population, community, and ecosystem levels).
6. A description of the biota in surface water bodies on, adjacent to, or affected by the Facility.
7. A description of any State and Federal endangered or threatened species (both proposed and listed) near the Facility.

Section IV: Investigation Results and Analysis

Respondent shall prepare an analysis and summary of all facility investigations and their results. The investigation data should be sufficient in quality (e.g., quality assurance procedures have been followed) and quantity to describe the nature and extent of contamination to the extent necessary to protect human health and/or the environment, potential threat to human health and/or the environment, and to support the CMS and/or IMs.

A. Data Analysis

Respondent shall analyze all facility investigation data outlined in Section III and prepare a report on the type and extent of contamination at the Facility which has not been eliminated from further investigation by the screening methods used, including sources and migration pathways. The report shall describe the extent of contamination (qualitative/quantitative) in relation to background levels indicative for the area as well as in relation to applicable screening levels.

B. Analysis of Risk

Respondent may determine as necessary an analysis of risk at the Facility. This analysis would include ecological as well as human health risk and shall be consistent with applicable guidance provided in Attachment VII. Risk may be evaluated at several milestones within the process, as developed in U.S. EPA-approved RFI Workplan.

All activities in conducting corrective action pursuant to this Order will allow for risk screening steps to be conducted with the data available at the risk assessment phase as well as within the RFI and CMS as appropriate. Generally, a screening risk assessment would be conducted during the RFI with additional, more detailed analysis, including appropriate cumulative risk, occurring as more data becomes available. The highest level of risk analysis may occur later in the CMS stage.

C. Media Cleanup Standards

Respondent shall provide information as required to support U.S. EPA's selection/development for media cleanup standards (MCSS) of any releases that may have adverse effects on human health and the environment due to migration of waste constituents. MCSS are generally to be developed using risk assessment and are to contain such terms and provisions as necessary to protect human

health and the environment, including the provisions stated below.

1. Groundwater Cleanup Standards

Respondent shall provide information to support U.S. EPA's selection/development of groundwater cleanup standards for all of the constituents of concern found in the groundwater during the Facility Investigation (Section III). The groundwater cleanup standards shall consist of:

- The MCL value for any constituents for which an MCL has been promulgated under the Safe Drinking Water Act;
- Background concentration of the constituent in the ground water; or
- An alternate standard [e.g., an alternate concentration limit (ACL) for a regulated unit] to be approved by U.S. EPA.

2. Soil Cleanup Standards

Respondent shall provide information to support U.S. EPA's selection/development of soil cleanup standards. U.S. EPA may require the following information to support the standards selected/developed:

- The volume and physical and chemical characteristics of the wastes in the unit;
- The effectiveness and reliability of containing, confining, and collecting systems and structures in preventing contaminant migration;
- The hydrologic characteristics of the unit and the surrounding area, including the topography of the land around the unit;
- The patterns of precipitation in the region;
- The existing quality of surface soils, including other sources of contamination and their cumulative impacts on surface soils;
- The potential for contaminant migration and impact to the underlying groundwater;
- The patterns of land use in the region;
- The potential for health risks caused by human exposure to hazardous waste and/or hazardous constituents; and
- The potential for risk to wildlife and vegetation caused by exposure to hazardous waste and/or hazardous constituents.

3. Surface Water and Sediment Cleanup Standards

Respondent shall provide information to support U.S. EPA's selection/development of surface water and sediment cleanup standards. U.S. EPA may require the following information to support the standards selected/developed:

- The volume and physical and chemical characteristics of the wastes in the unit;
- The effectiveness and reliability of containing, confining, and collecting systems and structures in preventing contaminant migration;
- The hydrologic characteristics of the unit and the surrounding area, including the topography of the land around the unit;
- The patterns of precipitation in the region;
- The quantity, quality, and direction of groundwater flow;
- The proximity of the unit to surface waters;
- The current and potential uses of nearby surface waters and any water quality standards established for those surface waters;
- The existing quality of surface waters, including other sources of contamination and their cumulative impacts on surface waters;
- The potential for risk to wildlife and vegetation caused by exposure to hazardous waste and/or hazardous constituents;
- The patterns of land use in the region; and
- The potential for health risks caused by human exposure to hazardous waste and/or hazardous constituents.

4. Air Cleanup Standards

Respondent shall provide information to support U.S. EPA's selection/development of air cleanup standards. U.S. EPA may require the following information to support the standards selected/developed:

- The volume and physical and chemical characteristics of the wastes in the unit, including its potential for the emission and dispersal of gases, aerosols and particulates;
- The effectiveness and reliability of systems and structures to reduce or prevent emissions of hazardous constituents to the air;
- The operating characteristics of the unit;
- The atmospheric, meteorological, and topographic characteristics of the unit and the surrounding area;

- The existing quality of the air, including other sources of contamination and their cumulative impact on the air;
- The potential for health risks caused by human exposure to hazardous waste and/or hazardous constituents; and
- The potential for risk to wildlife and vegetation caused by exposure to hazardous waste and/or hazardous constituents.

5. Other Relevant and Applicable Cleanup Standards

Respondent shall identify, as necessary based on site-specific factors, all relevant and applicable standards for the protection of human health and the environment (e.g., National Ambient Air Quality Standards, Indiana Water Quality Standards, water quality criteria, health advisories, proposed MCL's, etc.).

Section V: Progress Reports

Respondent will, at a minimum, provide U.S. EPA with signed monthly progress reports. These reports are required to contain the following information, but U.S. EPA requirements are not limited to this list:

1. A description and estimate of the percentage of the RFI completed;
2. Summaries of all findings in the reporting period, including results of any sampling and analysis;
3. Summaries of all changes made in the RFI during the reporting period;
4. Summaries of all contacts with representatives of the local community, public interest groups or State government during the reporting period;
5. Summaries of all contacts made regarding access to off-site property;
6. Summaries of all problems encountered during the reporting period;
7. Actions being taken to rectify problems;
8. Changes in relevant personnel during the reporting period;
9. Projected work for the next reporting period; and
10. Copies of daily reports, inspection reports, laboratory/monitoring data, etc.

Section VI: Proposed Schedule

Respondent will provide U.S. EPA with RFI submittals according to the following schedule:

Facility Submission	Due Date
Description of Current Conditions (Section I)	30 days after the effective date of the Order
RFI Workplan (Section II)	60 days of receipt of U.S. EPA comments on the DOCC Report
Draft RFI Report (Sections III and IV)	As scheduled in the approved RFI Workplan
Final RFI Report	45 days after receipt of comments on the Draft RFI Report
Progress Reports on Sections I through IV	Monthly

ATTACHMENT III

Scope of Work for a Corrective Measures Study

Purpose

The purpose of the CMS portion of the RCRA corrective action process is to identify and evaluate potential remedial alternatives for the releases that have been identified at and/or from the Facility that pose an unacceptable risk to human health and/or the environment.

Scope

A CMS Report is, unless otherwise specified by U.S. EPA, a required element of the CMS. The CMS consists of the following components:

Section I: CMS Report

- A. Introduction/Purpose
- B. Description of Current Conditions
- C. Media Cleanup Standards
- D. Identification, Screening and Development of Corrective Measure Alternatives
- E. Evaluation of A Final Corrective Measure Alternative
- F. Recommendation by Respondent for a Final Corrective Measure Alternative
- G. Public Involvement Plan

Section II: Progress Reports

Section III: Proposed Schedule

Section I: CMS Report

The CMS Report shall include the following elements:

A. Introduction/Purpose

Respondent shall describe the purpose of the document and provide a summary description of the project.

B. Description of Current Conditions

Respondent shall include a brief summary/discussion of any new information that has been discovered since the RFI current conditions report was provided. This discussion should concentrate on those issues which could significantly affect the evaluation and selection of the corrective measures alternative(s).

C. Media Cleanup Standards

Respondent may propose media cleanup standards. The standards must be based on promulgated Federal and State standards, risk derived standards, all data and information gathered during the corrective action process (e.g., from IM, RFI, etc.), and/or other applicable guidance documents. If no other guidance exists for a given contaminant and media, Respondent shall propose and justify a media cleanup standard.

D. Identification, Screening, and Development of Corrective Measure Alternatives

1. Identification: List and briefly describe potentially applicable technologies for each affected media that may be used to achieve the corrective action objectives. Respondent should consider including a table that summarizes the available technologies. Depending on the site-specific situation, U.S. EPA may require Respondent to consider additional technologies.

Respondent should consider innovative treatment technologies, especially in situations where there are a limited number of applicable corrective measure technologies. Innovative technologies are defined as those technologies utilized for remediation other than incineration, solidification/stabilization, and pumping with conventional treatment for contaminated groundwater. Innovative treatment technologies may require extra effort to gather information, to analyze

options, and to adapt the technology to the site-specific situation. Treatability studies and on-site pilot scale studies may be necessary for evaluating innovative treatment technologies.

2. Screening: When, Respondent is required to, or chooses to, evaluate a number of corrective measures technologies. Respondent will evaluate the technology limitations to show why certain corrective measures technologies may prove unfeasible to implement given existing waste and site-specific conditions.

Likewise, if only one corrective measure alternative is being analyzed, Respondent must indicate any technological limitations given waste and site-specific conditions at the Facility for which it is being considered. Respondent should consider including a table that summarizes these findings.

3. Corrective Measure Development: As required by U.S. EPA, Respondent shall assemble the technologies that pass the screening step into specific alternatives that have potential to meet the corrective action objectives for each media. Options for addressing less complex sites could be relatively straight-forward and may only require evaluation of a single or limited number of alternatives.

Each alternative may consist of an individual technology or a combination of technologies used in sequence (i.e., treatment train). Depending on the site-specific situation, different alternatives may be considered for separate areas of the Facility. List and briefly describe each corrective measure alternative.

E. Evaluation of a Final Corrective Measure Alternative

For each remedy which warrants a more detailed evaluation, including those situations when only one remedy is being proposed, Respondent shall provide detailed documentation of how the potential remedy will comply with each of the standards listed below. These standards reflect the major technical components of remedies including cleanup of releases, source control and management of wastes that are generated by remedial activities. The specific standards are provided below.

1. Protect human health and the environment.
2. Attain media cleanup standards set by U.S. EPA.

3. Control the source of releases so as to reduce or eliminate, to the extent practicable, further releases that may pose a threat to human health and the environment.
4. Comply with any applicable standards for management of wastes.
5. Other Factors.

In evaluating the selected alternative or alternatives Respondent shall prepare and submit information that documents that the specific remedy will meet the standards listed above. The following guidance should be used in completing this evaluation. This guidance provides examples of the types of information that would be supportive; U.S. EPA may require additional information.

1. **Protect Human Health and the Environment**
Corrective action remedies must be protective of human health and the environment. Remedies may include those measures that are needed to be protective, but are not directly related to media cleanup, source control, or management of wastes. An example would be a requirement to provide alternative drinking water supplies in order to prevent exposures to releases from an aquifer used for drinking water purposes. Another example would be a requirement for the construction of barriers or for other controls to prevent harm arising from direct contact with waste management units. Therefore, Respondent shall include a discussion on what types of short term remedies are appropriate for the particular Facility in order to meet this standard. This information should be provided in addition to a discussion of how the other corrective measure alternatives meet this standard.
2. **Attain Media Cleanup Standards Set by U.S. EPA**
Remedies will be required to attain media cleanup standards set by U.S. EPA which may be derived from existing State or Federal regulations (e.g. groundwater standards) or other standards. The media cleanup standards for a remedy will often play a large role in determining the extent of and technical approaches to the remedy. In some cases, certain technical aspects of the remedy, such as the practical capabilities of remedial technologies, may influence the media cleanup standards that are established.

As part of the necessary information for satisfying this requirement, Respondent shall address whether the

potential remedy will achieve the preliminary remediation objective as identified by U.S. EPA as well as other, alternative remediation objectives that may be proposed by Respondent. Respondent shall also include an estimate of the time frame necessary for each alternative to meet these standards.

3. Control the Sources of Releases

A critical objective of any remedy must be to stop further environmental degradation by controlling or eliminating further releases that may pose a threat to human health and the environment. Unless source control measures are taken, efforts to clean up releases may be ineffective or, at best, will essentially involve a perpetual cleanup. Therefore, an effective source control program is essential to ensure the long-term effectiveness and protectiveness of the corrective action program.

The source control standard is not intended to mandate a specific remedy or class of remedies. Instead, Respondent is encouraged to examine a wide range of options. This standard should not be interpreted to preclude the equal consideration of using other protective remedies to control the source, such as partial waste removal, capping, slurry walls, in-situ treatment/stabilization and consolidation.

As part of the CMS Report, Respondent shall address the issue of whether source control measures are necessary, and if so, the type of actions that would be appropriate. Any source control measure proposed should include a discussion on how well the method is anticipated to work given the particular situation at the Facility and the known track record of the specific technology.

4. Comply With Any Applicable Standards for Management of Wastes.

Respondent shall include a discussion of how the specific waste management activities will be conducted in compliance with all applicable State or Federal regulations (e.g., closure requirements, land disposal restrictions).

5. Other Factors

There are five general factors that will be considered as appropriate by U.S. EPA in selecting/approving a

remedy that meets the four standards listed above. These factors represent a combination of technical measures and management controls for addressing the environmental problems at the Facility. The five general decision factors include:

- a. Long-term reliability and effectiveness;
- b. Reduction in the toxicity, mobility or volume of wastes;
- c. Short-term effectiveness;
- d. Implementability; and
- e. Cost.

U.S. EPA may request Respondent to provide additional information to support the use of these factors in the evaluation of viable remedial alternatives. Examples of the types of information that may be requested are provided below:

- a. Long-term Reliability and Effectiveness
Demonstrated and expected reliability is a way of assessing the risk and effect of failure. Respondent may consider whether the technology or a combination of technologies have been used effectively under analogous site conditions, whether failure of any one technology in the alternative would have an immediate impact on receptors, and whether the alternative would have the flexibility to deal with uncontrollable changes at the site (e.g., heavy rain storms, flooding, earthquakes, etc.).

Most corrective measure technologies, with the exception of destruction, deteriorate with time. Often, deterioration can be slowed through proper system operation and maintenance, but the technology eventually may require replacement. Each corrective measure alternative should be evaluated in terms of the projected useful life of the overall alternative and of its component technologies. Useful life is defined as the length of time the level of effectiveness can be maintained.

- b. Reduction in the Toxicity, Mobility or Volume of Wastes
As a general goal, remedies will be preferred that employ techniques, such as treatment technologies,

that are capable of eliminating or substantially reducing the inherent potential for the wastes in SWMUs (and/or contaminated media at the Facility) to cause future environmental releases or other risks to human health and the environment. There may be some situations where achieving substantial reductions in toxicity, mobility or volume may not be practical or even desirable. Examples might include large, municipal-type landfills, or wastes such as unexploded munitions that would be extremely dangerous to handle, and for which the short-term risks of treatment outweigh potential long-term benefits.

Estimates of how much the corrective measures alternatives will reduce the waste toxicity, volume, and/or mobility may be helpful in applying this factor. This may be done through a comparison of initial site conditions to expected post-corrective measure conditions.

c. Short-term Effectiveness

Short-term effectiveness may be particularly relevant when remedial activities will be conducted in densely populated areas, or where waste characteristics are such that risks to workers or to the environment are high and special protective measures are needed. Possible factors to consider include fire, explosion, exposure to hazardous substances and potential threats associated with treatment, excavation, transportation, and redisposal or containment of waste material.

d. Implementability

Implementability will often be a determining variable in shaping remedies. Some technologies will require State or local approvals prior to construction, which may increase the time necessary to implement the remedy. In some cases, State or local restrictions or concerns may necessitate eliminating or deferring certain technologies or remedial approaches from consideration in remedy selection. Information to consider when assessing implementability may include:

- i. The administrative activities needed to implement the corrective measure alternative

(e.g., permits, rights of way, off-site approvals, etc.) and the length of time these activities will take;

- ii. The constructibility, time for implementation, and time for beneficial results;
- iii. The availability of adequate off-site treatment, storage capacity, disposal services, needed technical services and materials; and
- iv. The availability of prospective technologies for each corrective measure alternative.

e. Cost

The relative cost of a remedy may be an appropriate consideration, especially in those situations where several different technical alternatives to remediation will offer equivalent protection of human health and the environment, but may vary widely in cost. However, in those situations where only one remedy is being proposed, the issue of cost would not need to be considered. Cost estimates could include costs for: engineering, site preparation, construction, materials, labor, sampling/analysis, waste management/disposal, permitting, health and safety measures, training, operation and maintenance, etc.

F. Recommendation by Respondent for a Final Corrective Measure Alternative

In the CMS Report, Respondent may recommend a preferred remedial alternative for consideration by U.S. EPA. Such a recommendation should include a description and supporting rationale for the proposed remedy, consistent with the remedial standards and the decision factors discussed above. Such a recommendation is not required and U.S. EPA still retains the role of remedy selection.

G. Public Involvement Plan

After the CMS has been performed by Respondent and the U.S. EPA has selected a preferred alternative for proposal in the Statement of Basis, it is the agency's policy to request public comment on the Administrative Record and the proposed corrective measure(s). Changes to the proposed corrective measure(s) may be made after consideration of public comment. U.S. EPA may also require that Respondent perform additional corrective measures

studies. If the public is interested, a public meeting may be held. After consideration of the public's comments on the proposed corrective measure, the agency develops the Final Decision and Response to Comments to document the selected corrective measure, the agency's justification for such selection, and the response to the public's comment. Additional public involvement activities may be necessary, based on site-specific circumstances.

Section II: Progress Reports

Respondent will, at a minimum, provide U.S. EPA with signed monthly progress reports. These reports are required to contain the following information, but U.S. EPA requirements are not limited to this list:

1. A description and estimate of the percentage of the CMS completed;
2. Summaries of all findings in the reporting period, including results of any pilot studies;
3. Summaries of all changes made in the CMS during the reporting period;
4. Summaries of all contacts with representative of the local community, public interest groups or State government during the reporting period;
5. Summaries of all contacts made regarding access to off-site property;
6. Summaries of all problems encountered during the reporting period;
7. Actions being taken to rectify problems;
8. Changes in relevant personnel during the reporting period;
9. Projected work for the next reporting period; and
10. Copies of daily reports, inspection reports, laboratory/monitoring data, etc.

Section III: Proposed Schedule

Respondent will provide U.S. EPA with CMS submittals according to the following schedule:

Facility Submission	Due Date
Draft CMS Workplan (Section I)	Within 60 days of U.S. EPA approval of the RFI Report
Draft CMS Report (Section I)	In accordance with the U.S. EPA-approved CMS Workplan Schedule
Final CMS Report (Section I)	45 days after Public and U.S. EPA Comments on the Draft Final CMS
Progress Reports on Sections I	Monthly

ATTACHMENT IV

Scope of Work for Corrective Measures Implementation

Purpose

The purpose of the CMI program is to design, construct, operate, maintain and monitor the performance of the Corrective Measures selected by U.S. EPA and other measures/additional work determined necessary by U.S. EPA pursuant to this Order such that the performance standards are achieved and maintained. Respondent shall furnish all personnel, materials and services necessary for the implementation of the Corrective Measures.

Scope

The CMI program shall consist of the following components:

Section I: CMI Work Plan

- A. Program Management Plan
- B. Public Involvement Plan
- C. Health and Safety Plan
- D. Quality Assurance Project Plan (if necessary)
- E. Sampling and Analysis Plan (if necessary)
- F. Surveys (if necessary)

Section II: Corrective Measures Design

- A. Preliminary Design (if necessary)
- B. Prefinal and Final Designs
- C. Operation and Maintenance Plan (if necessary)
- D. Cost Estimate
- E. Project Schedule
- F. Construction Quality Assurance Objectives

Section III: Corrective Measures Construction

- A. Responsibility and Authority
- B. Construction Quality Assurance Personnel Qualifications
- C. Inspection Activities
- D. Sampling Requirements
- E. Documentation

Section IV: Other Reports and Submissions

- A. Progress
- B. Construction Completion Report
- C. Attainment of Groundwater Performance Standards Report (if necessary)
- D. Completion of Work Report (if necessary)
- E. Institutional Controls (if necessary)

Section V: Proposed Schedule

Section I: CMI Work Plan

Respondent shall prepare and submit a CMI Work Plan which includes the development and implementation of several plans, which shall be prepared concurrently. Respondent shall submit a draft CMI Work Plan within 60 days of notification of U.S. EPA's selection of the Corrective Measures and submit a final CMI Work Plan within 45 days of receipt of U.S. EPA's comments on the draft CMI Work Plan. The CMI Work Plan includes the following:

A. Program Management Plan

Respondent shall prepare a Program Management Plan (PMP) which includes a discussion of the technical approach, engineering designs and plans, schedules, and personnel needed for performing the design, construction, operation, maintenance and monitoring of Corrective Measures for U.S. EPA review and approval. The PMP shall document the responsibility and authority of all organizations and key personnel involved with the implementation. The PMP shall also include a description of qualifications of key personnel directing the Corrective Measure Design and Implementation, including contractor personnel.

B. Public Involvement Plan

The existing Public Involvement Plan (PIP) shall be revised to describe the community relations program to be implemented by Respondent during the design and construction subject to the approval of U.S. EPA. Specific activities which must be conducted include the revision of the PIP to reflect knowledge of community concerns and involvement during design and construction and the preparation of a fact sheet at the completion of the engineering design. At the request of U.S. EPA, Respondent shall participate in the preparation of information disseminated to the public and in providing information for public meetings that may be held or sponsored by U.S. EPA.

C. Health and Safety Plan

Respondent shall submit a Health and Safety Plan (HSP), which is not subject to U.S. EPA approval, that is designed to protect on-site personnel and area residents from physical, chemical and other hazards posed by the Corrective Measures, including pre-design studies.

D. Quality Assurance Project Plan (if necessary)

Respondent shall prepare a Quality Assurance Project Plan (QAPP) to document all monitoring procedures, sampling, field measurements, and sample analyses to be performed during the Corrective Measures, so as to ensure that all information, data and resulting decisions are technically sound, statistically valid and properly documented. The QAPP shall be prepared in accordance with Attachment V. At the request of U.S. EPA, Respondent shall participate in a pre-QAPP meeting with U.S. EPA prior to preparation of any QAPP.

A performance audit may be conducted by U.S. EPA on the laboratories selected by Respondent.

E. Sampling and Analysis Plan (if necessary)

Respondent shall develop a Sampling and Analysis Plan (SAP) for the predesign field activities and any monitoring programs required by this Order. Respondent shall submit the SAP addressing predesign field activities with the draft CMI Work Plan and shall propose a schedule for the submittal of any additional sampling plans. The SAP shall include, at a minimum:

1. A description of the proposed field activities;
2. The proposed locations of soil borings, ground water monitoring wells and surface water monitoring points;
3. A description of how the SAP is expected to meet the requirements of the final remedy;
4. A description of the planned operation and maintenance (O&M) activities, including the anticipated frequency of each O&M task;
5. A flow chart and schedule of work to be performed during the CMI.

F. Surveys (if necessary)

Examples of surveys that might be necessary include: a land survey to delineate the extent of the area to be subject to deed restrictions.

Section II: Corrective Measures Design

Respondent shall prepare final construction plans and specifications to implement the Corrective Measures at the Facility which have been selected by U.S. EPA. The final product of the Corrective Measures Design shall be a technical package (or packages) that contain and address all elements necessary to accomplish the Corrective Measures. This includes all design

support activities, initial permitting and access requirements, operation and maintenance, and institutional controls, as well as technical elements.

A. Preliminary Design (if necessary)

Respondent shall submit a Preliminary Design when the design effort is approximately 50% complete. The Preliminary Design submittal shall include or discuss, at a minimum, the following:

1. Design strategy and basis, including compliance with all applicable or relevant environmental and public health standards and minimization of environmental and public impacts;
2. Technical factors of importance, including use of currently accepted environmental control measures and technology, design constructability, and use of currently acceptable construction practices techniques;
3. A summary of activities performed and data generated during Corrective Measures Design or Predesign, including results and interpretations of data and studies;
4. Design assumptions and parameters, including design restrictions and process performance criteria;
5. Real estate, easement and permit requirements;
6. Preliminary construction schedule, including contracting strategy;
7. Discussion of the possible sources of error and references to possible operation and maintenance problems;
8. Detailed drawings of the proposed designs, including qualitative and quantitative flow sheets;
9. Tables listing equipment and specifications;
10. Tables giving material and energy balances; and
11. Sample calculations and derivation of equations essential to understanding the report.

B. Prefinal and Final Designs

Respondent shall submit the Prefinal Design when the design effort is 95% complete and shall submit the Final Design when the design effort is 100% complete. The Prefinal Design shall fully address all U.S. EPA comments on the Preliminary Design. After receipt of U.S. EPA comments on the Prefinal Design, Respondent shall execute the required revisions and submit the Final Design with reproducible drawings and specifications suitable for bid advertisement. The Final Design consists of the Final Design Plans and Specifications (100% complete), Final Construction Cost Estimate, Final Operation and Maintenance Plan, Construction

Quality Assurance Objectives, Final Project Schedule and Final Health and Safety Plan specifications.

U.S. EPA may require additional work, including but not limited to studies, to supplement the available technical data. Respondent shall furnish all equipment and personnel necessary to complete any additional work needed. Draft and final reports shall be prepared and present all data obtained during the additional studies, a summary of the results, and conclusions.

C. Operation and Maintenance Plan (if necessary)

Respondent shall prepare an Operation and Maintenance (O&M) Plan to cover both implementation and long term maintenance of the Corrective Measures. A draft O&M Plan shall be submitted concurrently with the Prefinal Design and the final O&M Plan with the Final Design. The plan shall include the following elements:

1. Description of normal O&M:
 - a. Description of tasks for operation;
 - b. Description of tasks for maintenance;
 - c. Description of prescribed treatment or operation conditions; and
 - d. Schedule showing frequency of each O&M task.
2. Description of potential operating problems:
 - a. Description and analysis of potential operation problems;
 - b. Sources of information regarding problems; and
 - c. Common and/or anticipated remedies.
3. Description of routine monitoring and laboratory testing:
 - a. Description of monitoring tasks;
 - b. Description of required laboratory tasks and their interpretation;
 - c. Required data collection, Quality Assurance Project Plan (QAPP);
 - d. Schedule of monitoring frequency; and
 - e. Description of triggering mechanisms for ground water/surface water monitoring results.
4. Description of alternate O&M:
 - a. Should system fail, alternate procedures to prevent release or threatened releases of hazardous substances, pollutants or contaminants which may endanger public health and the environment or exceed cleanup standards; and
 - b. Analysis of vulnerability and additional resource requirements should a failure occur.
5. Corrective steps:

- a. Description of corrective steps to be implemented in the event that cleanup or performance standards are not met; and
 - b. Schedule for implementing these corrective steps.
- 6. Safety plan:
 - a. Description of precautions, of necessary equipment, etc., for site personnel; and
 - b. Safety tasks required in event of systems failure.
- 7. Description of equipment:
 - a. Equipment identification;
 - b. Installation of monitoring components;
 - c. Maintenance of site equipment; and
 - d. Replacement schedule for equipment and installed components.
- 8. Records and reporting mechanisms required:
 - a. Daily operating logs;
 - b. Laboratory records;
 - c. Records for operating costs;
 - d. Mechanism for reporting emergencies;
 - e. Personnel and maintenance records; and
 - f. Monthly/annual reports to State agencies.

D. Cost Estimate

Respondent shall refine the cost estimate developed in the CMS to reflect the more detailed/accurate design plans and specifications being developed. The cost estimate shall include both capital and O&M costs. An Initial Cost Estimate shall be submitted simultaneously with the Prefinal Design and the Final Cost Estimate with the Final Design.

E. Project Schedule

Respondent shall develop a project schedule for construction and implementation of the Corrective Measures which identifies timing for initiation and completion of all critical path tasks. Respondent shall specifically identify dates for completion of the project and major interim milestones. An initial project schedule shall be submitted simultaneously with the Prefinal Design and a final project schedule with the Final Design.

F. Construction Quality Assurance Objectives

Respondent shall identify and document the objectives and framework for the development of a construction quality assurance program including, but not limited to the following: responsibility and authority; personnel qualifications; inspection activities; sampling requirements and documentation.

Draft Construction Quality Assurance Objectives shall be submitted simultaneously with the Prefinal Design and the Final Construction Quality Assurance Plan shall be submitted following U.S. EPA approval of the Final Design.

Section III: Corrective Measures Construction

Respondent shall finalize the Construction Quality Assurance Plan incorporating comments received on the draft Construction Quality Assurance Plan submitted with the Prefinal Design. Within 45 days of U.S. EPA approval of the Final Design, Respondent shall implement a construction quality assurance (CQA) program to ensure, with a reasonable degree of certainty, that a completed Corrective Measure will meet or exceed all design criteria, plans and specifications. The CQA Plan is a facility specific document which must be approved by U.S. EPA prior to the start of the construction. At a minimum, the CQA plan should include the elements which are summarized below. Upon U.S. EPA approval of the CQA Plan, Respondent shall construct and implement the Corrective Measures in accordance with the approved design, schedule and CQA plan. Respondent shall also implement the elements of the approved O&M plan.

A. Responsibility and Authority

Respondent shall describe fully in the CQA Plan the responsibility and authority of all organizations (i.e., technical consultants, construction firms, etc.) and key personnel involved in the construction of the corrective measures. Respondent shall also identify a CQA officer and the necessary supporting inspection staff.

B. Construction Quality Assurance Personnel Qualifications

Respondent shall set forth the qualifications of the CQA Officer and supporting inspection personnel shall be presented in the CQA plan to demonstrate that they possess the training and experience necessary to fulfill their identified responsibilities.

C. Inspection Activities

Respondent shall summarize in the CQA plan the observations and tests that will be used to monitor the construction and/or installation of the components of the Corrective Measures. The plan shall include the scope and frequency of each type of inspection. Inspections shall verify compliance with environmental requirements and include, but not be limited to air quality and emissions monitoring records, waste disposal records

(e.g., RCRA transportation manifests), etc. The inspection shall also ensure compliance with all health and safety procedures. In addition to the oversight inspections, Respondent shall conduct construction inspections.

Within 30 days after Respondent makes a preliminary determination that construction is complete, Respondent shall notify U.S. EPA for the purposes of conducting an inspection. The inspection shall consist of a walk-through inspection of the entire project site. The inspection is to determine whether the project is complete and consistent with the contract documents and the U.S. EPA-approved Corrective Measures. Any outstanding construction items discovered during the inspection shall be identified and noted. Additionally, treatment equipment, if installed, shall be operationally tested by Respondent. Respondent shall certify that the equipment has performed to meet the purpose and intent of the specifications. Retesting will be completed where deficiencies are revealed. Respondent shall outline in the inspection report the outstanding construction items, actions required to resolve items, completion date for these items and date for final inspection.

Upon completion of any outstanding construction items, Respondent shall notify U.S. EPA for the purposes of conducting a final inspection. The final inspection shall consist of a walk-through inspection of the project site. Confirmation shall be made that outstanding items have been resolved.

D. Sampling Requirements

Respondent shall present in the CQA plan the sampling activities, sample size, sample locations, frequency of testing, criteria for acceptance and rejection and plans for correcting problems as addressed in the project specifications.

E. Documentation

Respondent shall describe in detail in the CQA plan the reporting requirements for CQA activities. This shall include such items as daily summary reports, inspection data sheets, problem identification and corrective measures reports, design acceptance reports and final documentation. Provisions for the final storage of all records shall be presented in the CQA Plan.

Section IV: Other Reports and Submissions

Respondent shall prepare plans, specifications and reports as set forth in Sections I through III to document the design,

construction, operation, maintenance and monitoring of the Corrective Measure. Other documentation shall include, but not be limited to the following:

A. Progress

Respondent shall at a minimum provide U.S. EPA with signed monthly progress reports during the design and construction phases and semi-annual progress reports for operation and maintenance activities containing:

1. A description and estimate of the percentage of the CMI completed;
2. Summaries of all findings;
3. Summaries of all changes made in the CMI during the reporting period;
4. Summaries of all contacts with representatives of the local community, public interest groups or State government during the reporting period;
5. Summaries of all problems or potential problems encountered during the reporting period;
6. Actions being taken to rectify problems;
7. Changes in personnel during the reporting period;
8. Projected work for the next reporting period; and
9. Copies of daily reports, inspection reports, laboratory/monitoring data, etc.

B. Construction Completion Report

Within 30 days of a successful final inspection, Respondent shall submit a Construction Completion Report. In the report, a registered professional engineer and Respondents Project Coordinator shall state that the Corrective Measures have been constructed in accordance with the design and specifications, to the best of their knowledge, and the performance standards have been attained. The written report shall include as-built drawings signed and stamped by a registered professional engineer. The report shall be certified by a Responsible Official pursuant to Section XIV of the Order. The Final O&M Plan shall be submitted concurrently with the Construction Completion Report.

C. Attainment of Ground Water Performance Standards Report (if necessary)

Within 45 days after Respondent concludes that the ground water performance standards have been attained, Respondent shall submit a written report and certification. In the report, a registered professional engineer and Respondents Project Coordinator shall

state that the ground water performance standards have been attained in full satisfaction of the requirements of this Order. The report shall be certified by a Responsible Official pursuant to Section XIV of the Order.

D. Completion of Work Report (if necessary)

This report shall be submitted by Respondent when construction is complete, performance standards have been attained and O&M is complete. Within 45 days after Respondent concludes that all phases of the work (including O&M and monitoring) have been completed, Respondent shall schedule and conduct a pre-certification inspection to be attended by representatives of Respondent and U.S. EPA. If, after the pre-certification inspection and any prefinal or subsequent final inspections required by U.S. EPA, Respondent still concludes that the work has been fully performed, Respondent shall submit within 30 days of a successful final inspection, a written Completion of Work Report to U.S. EPA for approval. In the report, a registered professional engineer and Respondents Project Coordinator shall state that the Corrective Measures have been completed in full satisfaction of the requirements of this Order. The written report shall include as-built drawings stamped by a registered professional engineer. The report shall be certified by a Responsible Official pursuant to Section XIV of the Order.

E. Institutional Controls (if necessary)

Respondent shall implement the deed notification/restrictions contained in the form set forth in U.S. EPA's decision on corrective measure(s).

Section V: Proposed Schedule

Respondent will provide U.S. EPA with the CMI submittals according to the following schedule:

Facility Submission	Due Date
Draft CMI Workplan (Section I)	60 days after notification of U.S. EPA's selection of Corrective Measures
Final CMI Workplan (Section I)	45 days after receipt of comments on the Draft CMI Workplan
Preliminary Design (<i>if necessary</i>) (Section II)	In accordance with the project schedule approved in the CMI Workplan
Prefinal Design (including Draft O&M and CQA Plans, <i>if necessary</i>) (Section II)	In accordance with the project schedule approved in the CMI Workplan
Final Design (including Final O&M Plan, <i>if necessary</i>) (Section II)	45 days after receipt of comments on the Prefinal Design

Facility Submission	Due Date
Final CQA Plan (Section III)	Within 45 days of approval of the Final Design
Initiate Construction of Corrective Measures Design (Section III)	Immediately upon approval of the CQAP
Initial Construction Inspection (Section III)	30 days after Construction Completion
Construction Completion Report (Section IV)	30 days after final Construction Inspection
O&M Progress Reports (Section IV)	No later than 6 months after approval of the Construction Completion Report and semi-annually thereafter
Attainment of GW Performance Standards Report (<i>if necessary</i>) (Section IV)	45 days after determination that GW performance standards have been attained
Completion of Work Inspection (<i>if necessary</i>) (Section IV)	45 days after completion of all work, including O&M
Completion of Work Report (<i>if necessary</i>) (Section IV)	30 days after final Completion of Work Inspection
Progress Reports on Sections I through IV	Monthly

ATTACHMENT V

Reference List

The following list comprises guidance documents and other information, in chronological order, which may be useful in implementing a RCRA Section 3008(h) Order. This list does not include every guidance document pertaining to work performed under a RCRA Section 3008(h) Order.

"Health and Safety Requirements of Employees Employed in Field Activities," U.S. EPA Order 1440.2, July 12, 1981.

"Corrective Measures for Releases to Ground Water from SWMUs," Draft Final, U.S. EPA/530-SW-88-020, March 1985.

"Corrective Measures for Releases to Soil from SWMUs," Draft Final U.S. EPA/530-SW-88-022, March 1985.

"Technical Guidance for Corrective Measures -- Subsurface Gas," U.S. EPA/530-SW-88-023, March 1985.

"Technical Guidance for Corrective Measures--Determining Appropriate Technology and Response for Air Releases," Draft Final, U.S. EPA/530-SW-88-021, March 1985.

"RCRA Ground-Water Monitoring Technical Enforcement Guidance Document (TEGD)," OSWER Directive 9950.1, September 1986.

"Technical Guidance Document: Construction Quality Assurance for Hazardous Waste Land Disposal Facilities," U.S. EPA 530/SW-86/031, OSWER Directive 9472.003, October 1986.

"RCRA Facility Assessment (RFA) Guidance," U.S. EPA/530/SW-86/053, October 1986.

"Data Quality Objectives for Remedial Response Activities," U.S. EPA/540/G-87/003 & 004, OSWER Directive 9335.0-7B, March 1987.

"Alternate Concentration Limit Guidance, Part 1: ACL Policy and Information Requirements," Interim Final, OSWER Directive 9481.00-6C, July 1987.

"A Compendium of Superfund Field Operations Methods," Two Volumes, U.S. EPA/540/P-87/001a&b, OSWER Directive 9355.0-14, August 1987.

"Technology Screening Guide for Treatment of CERCLA Soils and Sludges," U.S. EPA/540/2-88/004, September 1988.

"Ground-Water Modeling: An Overview and Status Report," U.S. EPA/600/2-89/028, December 1988.

"Risk Assessment Guidance for Superfund, Volume II: Environmental Evaluation Manual," Interim Final, U.S. EPA/540/1-89/001, March 1989.

"Ecological Assessment of Hazardous Waste Sites: A Field and Laboratory Reference Document," U.S. EPA 600/3-89/013, March 1989.

"Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities," Interim Final, U.S. EPA/530/SW-89/026, April 1989.

"Handbook of Suggested Practices for the Design and Installation of Ground-Water Monitoring Wells," U.S. EPA/600/4-89/034, April 1989.

"Stabilization/Solidification for CERCLA and RCRA Wastes," U.S. EPA/625/6-89/022, May 1989.

"Interim Final RCRA Facility Investigation (RFI) Guidance," Volumes I-IV, U.S. EPA/530/SW-89-031, May 1989.

"Technical Guidance Document: Final Covers on Hazardous Waste Landfills and Surface Impoundments," U.S. EPA/530/SW-89/047, July 1989.

"Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part A)," Interim Final, U.S. EPA/540/1-89/002, December 1989

"Air/Superfund National Technical Guidance Study Series," Volumes I-IV, U.S. EPA 450/1-89-001,002,003,004 (1989 and 1990).

"Handbook on In-Situ Treatment of Hazardous Waste-Contaminated Soils," U.S. EPA/540/2-90/002, 1990.

"Basics of Pump-and-Treat Groundwater Remediation Technology," U.S. EPA/600/8-90/003, March 1990.

"Framework for Ecological Risk Assessment," U.S. EPA/630/R-92/001, February 1991.

"Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors," OSWER Directive 9285.6-03, March 25, 1991.

"Synopses of Federal Demonstrations of Innovative Site Remediation Technologies," U.S. EPA/540/8-91/009, May 1991.

"Bibliography of Federal Reports and Publications Describing Alternative and Innovative Treatment Technologies for Corrective Action and Site Remediation," U.S. EPA/540/8-91/007, May 1991.

"Handbook: Ground Water," Volumes I and II, U.S. EPA/625/6-90/016 (a&b), September 1990 and July 1991.

"Guide for Conducting Treatability Studies under CERCLA: Aerobic Biodegradation Remedy Screening", U.S. EPA/540/2-91/013B, July 1991.

"Handbook: Stabilization Technologies for RCRA Corrective Actions," U.S. EPA/625/6-91/026, August 1991.

"Guide for Conducting Treatability Studies under CERCLA: Soil Vapor Extraction", U.S. EPA/540/2-91/019B, September 1991.

"Guide for Conducting Treatability Studies under CERCLA: Soil Washing," U.S. EPA/540/2-91/020B, September 1991.

"Selected Alternative and Innovative Treatment Technologies for Corrective Action and Site Remediation," U.S. EPA/540/8-91/092, 1991.

"Characterizing Heterogeneous Wastes: Methods and Recommendations," U.S. EPA/600/R-92/033, Feb. 1992.

"Final Guidance for Data Useability in Risk Assessment," (Parts A & B), OSWER Directive 9285.7-09A, April 1992.

"Literature Survey of Innovative Technologies for Hazardous Waste Site Remediation: 1987 - 1991," U.S. EPA/542/B-92/004, July 1992.

"Handbook of RCRA Ground-Water Monitoring Constituents: Chemical and Physical Properties," U.S. EPA/530/R-92/022, September 1992.

"Ground-Water Monitoring: Draft Technical Guidance," U.S. EPA/530-R-93-001, November 1992.

"Statistical Training Course for Ground-Water Monitoring Data Analysis," U.S. EPA/530/R-93/003, 1992.

"Guidance for Evaluating the Technical Impracticability of Ground-Water Restoration," OSWER Directive 9234.2-25, September 1993.

"RCRA Corrective Action Plan," OSWER Directive 9902.3-2A, May 1994.

"Ecological Risk Assessment Guidance for RCRA Corrective Action," U.S. EPA, Region 5, Interim Draft, October 1994.

"Land Use in the CERCLA Remedy Selection Process," OSWER Directive 9355.7-04, May 25, 1995.

"Standard Guide for Risk Based Corrective Action Applied to Petroleum Release Sites," ASTM E-1739-95, November 1995. (As approved by Region 5 guidance policy)

"Conducting Risk-Based Corrective Action for Federally-Regulated UST Petroleum Releases," U.S. EPA, Region 5, December 7, 1995.

"Sitting at the RCRA Data Quality Level Table, Update 1," U.S. EPA, Region 5, Memorandum, December 14, 1995.

"Soil Screening Guidance: Users Guide," OSWER Publication 9355.4-23, April 1996.

"Soil Screening Guidance: Technical Background Document," U.S. EPA/540/R-95/128, May 1996.

"Corrective Action for Releases From Solid Waste Management Units at Hazardous Waste Management Facilities," Advanced Notice of Proposed Rulemaking, 61 Fed. Reg. 19432, May 1, 1996.

"Region 9 Preliminary Remediation Goals (PRGs) 1996," U.S. EPA, Region 9, Annual Update, August 1, 1996.

"Region 5 Ecological Data Quality Levels," Final Report, August 26, 1996.

"U.S. EPA's Proposed Guidelines for Ecological Risk Assessment," 61 Fed. Reg. 47552, September 9, 1996. (Note: Final document to be released in early-1998.)

"Corrective Action Principles," U.S. EPA, Region 5, Memorandum, November 19, 1996.

"Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments," Interim Final, U.S. EPA/540/R-97/006, June 5, 1997.

"Ecological Data Quality Levels, RCRA Appendix IX Hazardous Constituents," U.S. EPA, Region 5, Draft Report, August 18, 1997.

"Region 5 RCRA Subtitle C Corrective Action Risk Assessment Guidance," U.S. EPA, Region 5, Letter and Enclosures, February 12, 1998.